VOL. XXXIII NEW YORK—THURSDAY, DECEMBER 16, 1915—CHICAGO No. 25

The AUTOMOBILE

Carbureters Classified

Basic Principles Analyzed—Five Divisions Suggested—Definite Trends Difficult to Decipher

CARBURETER development during the past year leaves it still impossible to see which type, if any particular one, will eventually dominate. Different manufacturers are producing instruments operating along entirely different lines yet aiming to accomplish the same results. The past twelve months have witnessed improvements in the carbureters and makers following different lines. New adherents have joined the different divisions so that it is as difficult as it was a year ago to decipher, even vaguely, the trend of development. One thing is certain, namely, that carbureter makers are endeavoring to keep pace with production, and if production in automobiles has resulted in simplified design and lower cost of production, the carbureter makers are awake to this realization and are keeping step in step with the demands of production.

Carbureter development in the last year has not brought out any new principles in the art, but effort has largely been confined to changing designs to meet the requirements of production as well as in some cases elaborating on present designs to meet more rigid requirements of car owners and manufacturers. Some manufacturers have made considerable changes in their designs to meet these new conditions, while others have brought out new models of a distinctly simplified type, yet incorporating the basic principles of the older and more complicated designs.

The demand for greater acceleration has been one of the distinctive requirements of the 1916 carbureter. With high-speed motors and multiplicity in cylinders together with a reduction in weight of reciprocating parts in the engine the problem of greater acceleration has been placed before carbureter makers, and they have wrestled with it very satisfactorily. Some makers have accomplished this asked-for acceleration by adding somewhat to the complexity of the design while others have started out with new basic principles in design with the hope of solving it in that way.

The year has shown a slight trend toward wider use of the hot-air attachment in preference to water heating. This movement is not general enough to be considered a trend and has been stimulated by the side-outlet carbureter, which eliminates the manifold. Heat in connection with a carbureter is needed to prevent condensation, which is avoided by the internal manifold in the side-outlet type. The production of side-outlet types constitutes one of the conspicuous movements of the season. The side-outlet design is now dividing production with the vertical-outlet design on a fifty-fifty basis. Some concerns that were late in getting their side-outlet types out are behind in orders. The more general use of block motor castings will greatly increase the use of this type.

Before taking up individually the work done during the year by the different carbureter makers it will simplify matters to analyze the general field of carburetion and classify the different makes according to the basic principle on which they are designed.

The Maybach Type

The simplest form of carbureter which incorporates the float chamber and the spraying nozzle was that credited to Maybach in Europe brought out in 1893. This carbureter, Fig. 1, embraced but two features, the float chamber with the float to maintain a fuel level, and the spraying nozzle in the air pipe. There were no regulations, no adjustments. There was a defi-

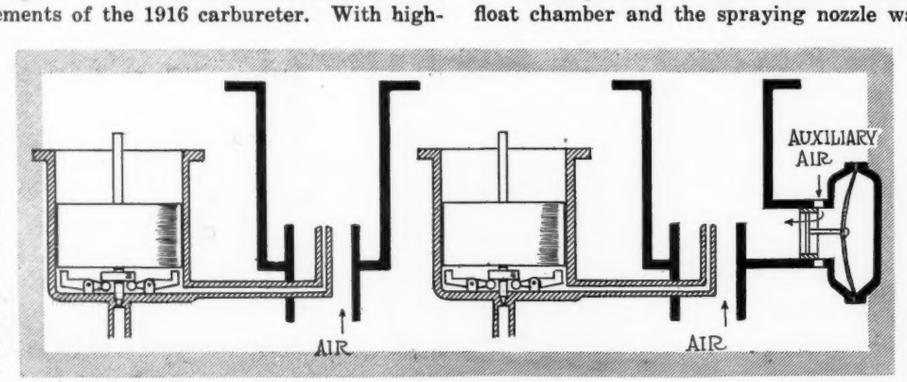


Fig. 1—Diagram of Maybach carbureter with float and nozzle

Fig. 2—Diagram of Krebs carbureter with auxiliary air valve added

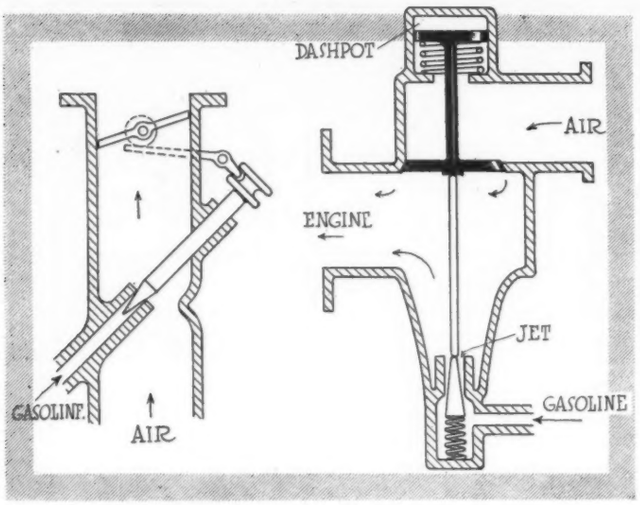


Fig. 3 (left)—Diagram of Schebler model L with metering pin controlled by throttle
Fig. 4 (right)—Diagram of new Schebler model T with metering pin controlled by air valve

nite size of air passage and a fixed size of nozzle out of which the fuel issued. The nozzle and the air passage were proportioned according to the richness of mixture, but once the size of each was set there was no changing.

This type of carbureter proved satisfactory in a relatively limited range of motor speeds such as existed at that time, but when the motor speeds increased, covering a range between 300 and 1200 r.p.m. this type proved inadequate. If it gave a satisfactory mixture for relatively low speeds the mixture was too rich in gasoline vapor on the higher speeds due to the increased air velocity past the nozzle or jet creating too great suction on the gasoline and increasing the rate of flow of gasoline in proportion to the volume of air.

Air Valve Added

It was this weakness in the Maybach type that led to the second important step in carburetion, namely, the introduction of what has come to be known as the auxiliary air valve, the credit of which has been ascribed to Krebs, an engineer of the Panhard company, Paris, France. Krebs realizing the failure in the Maybach design conceived the idea of adding more air when the engine speed increased and he accomplished this by an air valve, Fig. 2, in the form of a leather diaphragm, which while not affected by the relatively low motor speeds, was affected by the higher speeds and when sucked by the increased air current gradually opened an auxiliary valve adding to the air supply and thereby maintaining the desired proportion of gasoline vapor and air.

Air Valve Types

THE Krebs type can to-day be considered the simplest form of carbureter which operates satisfactorily and there are several different models now manufactured based on the principle of the auxiliary air valve only. In these the problem is worked out in different ways. One manufacturer uses a spring-controlled valve; another hopes to get better results by regulating the movement of the valve by two springs, instead of one; still another maker adds an air dashpot with the hope of getting finer regulation and a better functioning of the auxiliary air valve; another uses a dashpot filled with gasoline; and there are others who use metal balls to serve as the auxiliary valve; while others use what are known as weighted air valves. While they all differ in the details of working out the design they are, nevertheless, based on the basic principle of the auxiliary air valve as originally worked out by Krebs. For simplicity in nomenclature we will refer to this type as the air valve type. Some of the concerns manufacturing this type of carbureter are G. & A., Air-Friction, and Breeze. G. & A. uses different sizes of metal balls; Air-Friction uses a weighted air valve; and Breeze a spring-controlled valve.

Metering Pin Class

THE next type of carbureter may, for convenience, be referred to as the metering pin class, metering pin being synonymous with measuring pin. This division incorporates all that is in the air valve or Krebs classification but goes further and inserts a metering pin, which is a pin with a bevel point, not unlike the sharpened end of a lead pencil, in the nozzle or jet from which the gasoline issues. This pin is inserted with the object of regulating the flow of gasoline, and is used in addition to the auxiliary air valve so that this type incorporates four basic features: the float control, the auxiliary air valve, the nozzle in the air passage and lastly, the measuring pin in the nozzle.

Schebler Metering Pin

This metering pin is not stationary but is designed to be moved endwise, either raised or lowered so as to regulate the size of the opening through which the gasoline issues. A conventional form of it is that shown in Fig. 3 used on one Schebler model. The metering pin is linked with the throttle so that as the throttle is opened the metering pin is raised out of the nozzle so as to increase the flow of gasoline in a desired ratio with the increased air, the ratio of increase being obtained by various adjustments between the throttle and the metering pin.

There are other concerns which move the metering pin other than by the throttle, in fact, in the latest model T Schebler, Fig. 4, the metering pin is controlled by the auxiliary air valve. When the valve moves downward, opening, it carries with it the metering pin which extends downward into the jet and is designed to increase the jet volume as it is lowered, whereas in the older Schebler type the jet volume is increased by raising the metering pin. In both the auxiliary air valve is used. In one it is controlled by a spring and in model T by a dashpot and spring.

There are other carbureters in which the metering pin is regulated by what is known as a metering air valve, in short, a measuring air valve to control the measuring gasoline pin. An example is the Stewart, Fig. 5, in which the metering valve shown in black, is rather a complex affair. The metering pin stands vertically in the center of the valve and can be located by the collars on the lower end meshing with

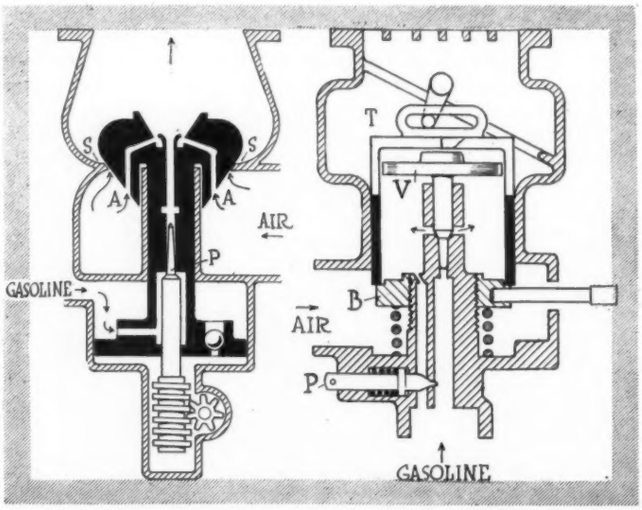


Fig. 5 (left)—Diagram of Stewart with metering pin P controlled by air valve shown in black
Fig. 6 (right)—Diagram of Heath with metering pin controlled by mushroom valve V

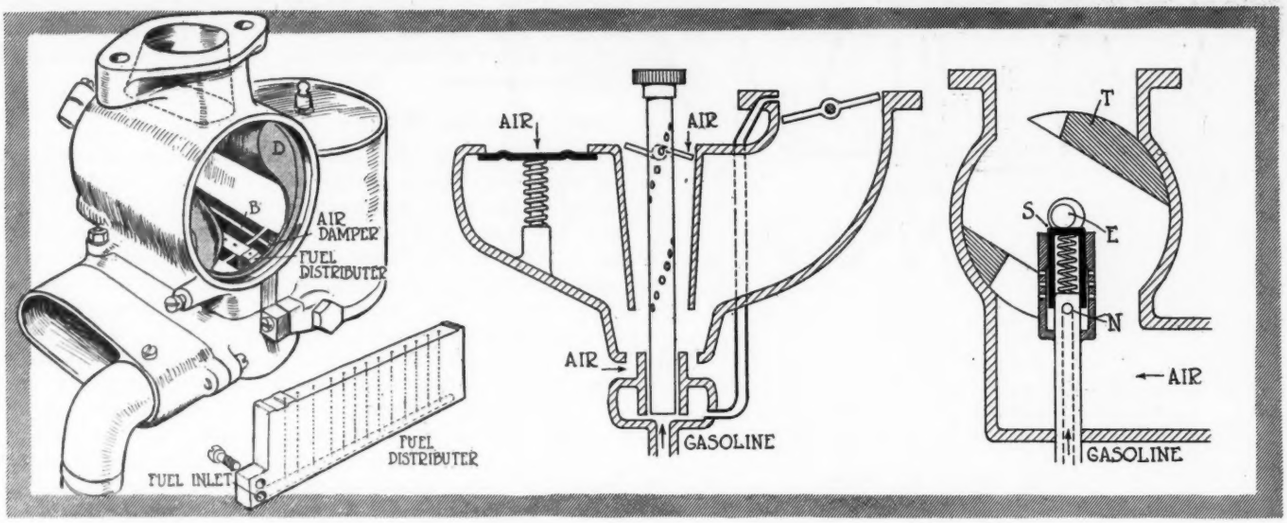


Fig 8 (left)—Master expanding carbureter showing the distributer with dotted lines indicating nozzles. Fig. 9 (center)—Diagram of Carter with standpipe nozzle having spirally-located perforations. Fig. 10 (right)—Diagram of Parkin showing nozzle N covered and uncovered by sleeve S

the small adjusting wheel by which the pin can be raised or lowered as desired. Normally the metering air valve by its inverted cone-shaped top fills the entire air space, the only open space for air to pass being through the two small openings *A* with the arrows indicating the direction of air flow. These passages have air capacity for only very low speeds and as soon as the motor requirements exceed their volume the suction of the engine begins lifting the entire air valve indicated in black. The higher this valve is lifted the wider is the space between it and the metering pin at the point *P* and the greater the volume of gasoline permitted to pass the jet. Also the greater the volume of air passing between it and its seat *S*. By the adjustment provided at the base of the metering pin, the pin is set to supply a definite amount of fuel when the air valve rests on its seat. This quantity can be regulated as desired. In order to get the best possible action of the air valve the lower end of it is in the form of a piston constituting a dashpot operating in a gasoline well. There is a ball valve by which the gasoline is permitted to rise from below to above the piston as the valve settles on its seat. This dashpot gives a more uniform movement and prevents the valve from fluttering.

Heath Metering Pin

The metering pin assumes still another form in the Heath carbureter, Fig. 6, in which it is supported on a mushroom-shaped valve *V* and within the throttle *T*. The throttle is a vertical cylinder open at both ends but the lower end is closed by resting on an adjustable base *B*. The top is open, only the blackened portions of the sides representing the cylinder wall. Raising the throttle *T*, which is equivalent to opening it, raises the lower end off the base piece, so admitting air. This air current impinging on the lower face of the valve *V* raises it, thereby lifting the metering pin out of the nozzle. The greater the air current the higher is the valve *V* raised and the more gasoline issues. This maker goes still further in his regulation by the adjustable throttle base *B* which can be raised or lowered by hand. In order to get a still more delicate relationship between the amount of air and gasoline the upper face of the base *B* is stepped so as to give a finer air regulation. A novel priming device takes the form of a plunger *P* which regulates a separate fuel passage that vertically parallels the fuel passage in the nozzle, and is shown at the left of it. Efforts tending for a more complete mixing of the air and gasoline vapor take the form of a spiral fin in the mixing chamber above the throttle and also a coarse screen across the top of the mixing chamber.

Still another form of carbureter using the metering pin regulation is the Newcomb, Fig. 7, in which the metering pin *P* is carried in a hollow plunger indicated in black, this plunger operating vertically in a cylinder *C* and being lifted in this cylinder by the motor suction. The stronger the demands of the motor the higher is the metering pin raised from the nozzle and the greater the amount of gasoline permitted to flow. The illustration shows the metering pin almost entirely out of the nozzle, and represents the condition with the motor operating at high speed. With the motor at rest the plunger shown in black would be lowered considerably, so that the metering pin would almost close the nozzle. With the first demands of the motor air is drawn from inside the plunger through holes *H* at the base and it is through these holes that the gasoline vapor must also escape and mingle with the air currents in the vertical channels at each side of the cylinder *C*. At the base of the plunger carrying the metering pin is an adjusting collar by which the height of this plunger when at rest can be altered so that a definite setting can be given the metering pin in the nozzle.

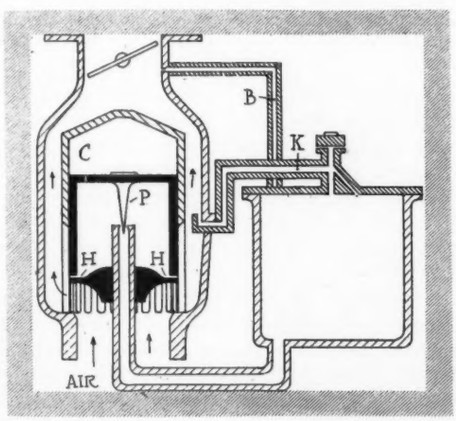


Fig. 7—Newcomb carbureter diagram with metering pin controlled by hollow air valve

Still a further type of metering pin carbureter is that used on the Sunderman, in which an auxiliary air valve, bearing practically the same position with regard to the metering pin as that in the Stewart, lifts the metering pin as the valve is lifted from its seat by the air current.

These five designs include practically all the makes which combine the metering pin and the auxiliary air valve in regulating the flow of gasoline. There are several makes not included herein which make use of the metering pin in controlling the flow of gasoline but introduce many other combinations, making it impossible to include them in this class. The Rayfield uses a metering pin in

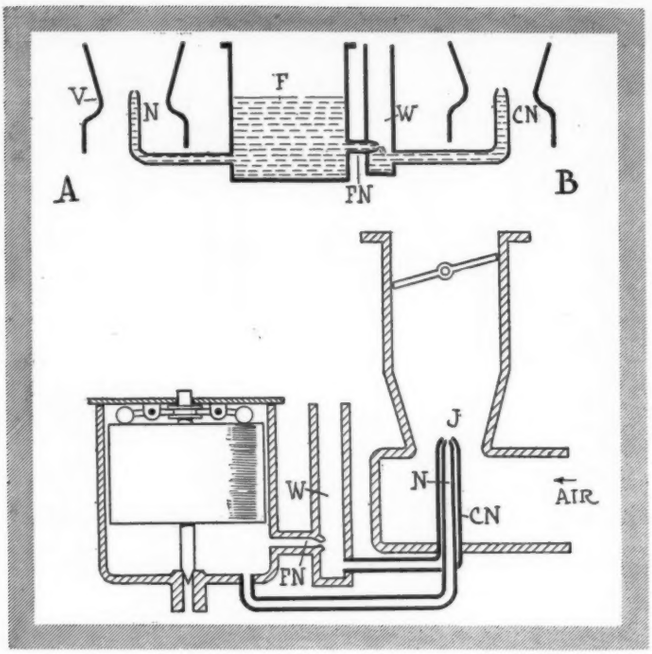


Fig. 11—Zenith compensating jet type made up of two carbureters, one at A, the other at B, which are united in the lower illustration

the main nozzle, but it also employs a secondary jet which places the instrument in a different classification.

Expanding Carbureter Types

THE third division of carbureters are those known as the expanding types and include such makes as Master, Carter, Parkin and Greuter. As the word expanding implies, this division might be designated as the multiple jet type in which the gasoline is fed through several openings rather than one, these openings being progressively uncovered or brought into use according to the opening of the throttle and the demands of the motor. In the Master there are a great many small openings progressively uncovered by the opening of the throttle. In the Carter the gasoline issues through a vertical standpipe in the mixing chamber, this standpipe having a series of small holes drilled in an ascending spiral so that the greater the motor suction the higher the gasoline rises in the standpipe and the more of these small holes it issues through. In the Parkin the fuel nozzle has a cap or covering over it which covering is raised or lowered as the throttle is opened and closed, thus increasing the flow of gasoline in proportion to the demands of air. In the Greuter, which is the only example of a multiple carbureter, there are really three separate nozzles in three separate mixing compartments, these individual carbureters being brought into operation progressively, according to the requirements of the motor.

While all of these expanding types of carbureters vary and are quite different in their external appearance they are really alike in their functioning, for which reason they are grouped under the one head of expanding types. Expanding means enlarging, which is done by bringing into use the additional nozzles or openings through which the fuel issues.

Fig. 8 shows how this is done in the Master. In the lower right is shown the fuel distributor with its thirteen vertical dotted lines indicating as many openings for the flow of gasoline from the main fuel passage in the base of this distributor. The top of this distributor is shown in position in the carbureter, as also is shown the barrel throttle *B* with its curved opening designed to start uncovering these thirteen nozzles in the distributor progressively from one end to the other until all are uncovered, thus establishing its right to be classified as an expanding type. This carbureter also has an air valve or damper, by which the volume of air entering over the top of the various nozzles can be regulated.

Carter Expanding Design

Fig. 9 shows why the Carter carbureter must be classed as an expanding type. In this carbureter is a standpipe constituting the spraying nozzle, and it is in this pipe that are drilled the various holes in the form of an ascending spiral, each hole in reality being a nozzle. At low speeds, when the gasoline is drawn only a moderate height in this standpipe, the fuel issues from but few of the lower holes. As the gasoline rises higher in the standpipe at intermediate speeds it issues from more of the openings; and when it rises still higher at high speeds yet more of the openings are brought into operation. The main air opening is in a vertical tube surrounding this standpipe so that the inrushing air passes along the pipe, excepting at the lower end. There is an auxiliary air valve.

Fuel regulation in the Parkin expanding carbureter is obtained mechanically as the throttle is opened. The throttle *T*, Fig. 10, is a horizontal revolving barrel type with its axis carrying an eccentric pin *E*. This pin bears on the top of a cylindrical sleeve *S* which covers the nozzle. By raising or lowering this sleeve the single large nozzle *N* is uncovered or covered in proportion as the throttle is closed or opened. This is accomplished mechanically by the eccentric *E*, which operates as the throttle is rotated. This eccentric can be adjusted as desired with relation to the throttle. The cylindrical throttle performs a double function: the upper part is the throttle proper and the lower part a variable air shutter. This lower portion controls the amount of air which passes the jet by varying the area of the passageway around the jet.

Compensating Jet Class

THE fourth classification of carbureters has for convenience been called the compensating jet type, and in this class are such makes as Zenith, Holley, Longuemare, and one of the Stromberg models. This carbureter type has been designated the non-moving-part division by some, a title more or less of a misnomer in that there are other carbureters without moving parts, yet which are entirely different in functioning from those mentioned in this division. For example, such as Master and Carter, are without moving parts, yet are expanding types, whereas Zenith, Holley, etc., are not expanding types, and yet are without moving parts.

The Zenith System

The basic principle of the compensating jet type is illustrated in Fig. 11 of the Zenith. This illustration is made up of three parts, parts *A* and *B* above showing the two elements which are incorporated in the complete carbureter shown below. This compensating jet type may be described as a two-fold type: Part *A* shows a float chamber to the right with a nozzle *N* leading into the venturi-shaped mixing passage *V* at the left. This part practically corresponds with the original Maybach carbureter design. It is simply a fixed nozzle located in a fixed air passage. The part *B* at the right illustrates the compensating feature. Here is what is termed a compensating nozzle *CN* in an air passage. This nozzle does not communicate direct with the float chamber *F*, but leads into a well *W*, which receives its supply of gasoline through a fixed nozzle *FN* in the float-chamber side. This well *W* is open to the atmosphere at the top. Its *modus operandi* is: When the motor is idle the gasoline is at the same level in the well *W* as in the float chamber *F* and also in the nozzle *CN*. With the acceleration of the motor the supply in the well *W* is soon consumed, after which air is drawn through the nozzle *CN* along with the gasoline, and it is this

fact of air and gasoline being fed through this nozzle which gives it the name of the compensating nozzle, the air being the medium which mixes with the gasoline and reduces the richness of the mixture.

Thus combining parts *A* and *B* we have a two-fold carbureter, shown in the lower portion of the illustration, where the two nozzles *N* and *CN* are arranged concentrically, one outside the other. The nozzle *N*, inside, draws its supply of gasoline direct from the float chamber, whereas the outside or compensating nozzle *CN* draws its supply from the atmospheric well *W*, which in turn is fed by the fixed nozzle *FN* from the float chamber. It is because the well *W* is open at the top to atmospheric pressure that this type of carbureter has been called by some the atmospheric type. The term compensating is preferable in that the compensating nozzle *CN* really takes care of the desired richness of the mixture. The main nozzle *N* would give a mixture too rich on the higher speeds, as was shown in the original Maybach, but combining the compensating nozzle *CN* with it there is obtained a reduced suction on the top of the jet at the point *J* by the fact that a certain amount of air is mixed with gasoline in coming through the compensating or outside nozzle, thereby reducing the gasoline flow at higher speeds and effecting the desired compensation between gasoline vapor and air in proportioning the mixture.

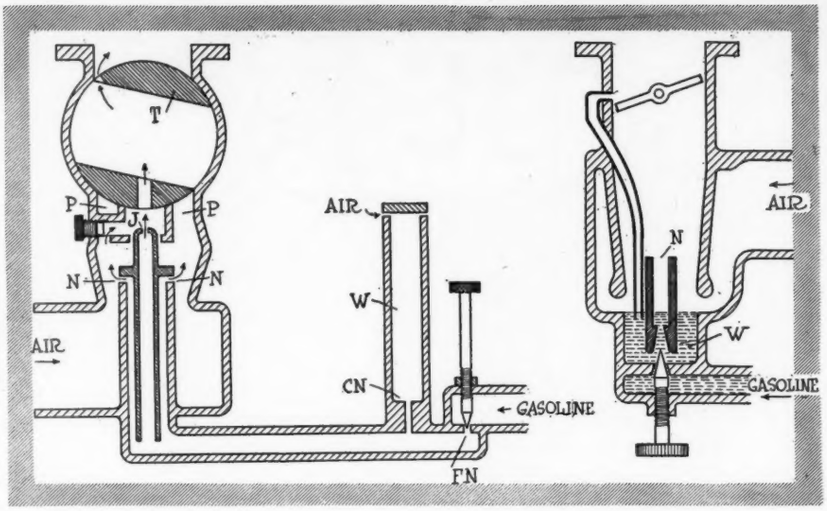


Fig. 12 (right)—Diagram Holley compensating jet type with main nozzle N in gasoline well. Fig. 13 (left)—Diagram Longuemare compensating jet type, main jet N, starting jet J and gasoline well W

The Compensating Holley

A second example of the compensating jet carbureter is the Holley, the principle of which is diagrammed in Fig. 12. The fuel flows into a little cup or well *W* past a needle valve, which is for hand regulation and does not enter into the basic principle of the design. Into this well *W* dips two nozzles, one *N* which dips deep into the well and ends in the lower part of the mixing chamber. This is the fixed nozzle. The other nozzle takes the form of a tube, which does not dip deeply into the well *W* and extends upward into the manifold above the throttle. This is the compensating nozzle. Study the working of this carbureter. When starting and the throttle is practically closed a rich mixture is sucked up the tube, giving easy starting. Opening the throttle brings the main nozzle *N* into action and soon the fuel may drop in the well *W* below the bottom of the pipe, so that instead of all gasoline being sucked up this pipe there is air mixed with the gasoline, thus giving the compensating effect.

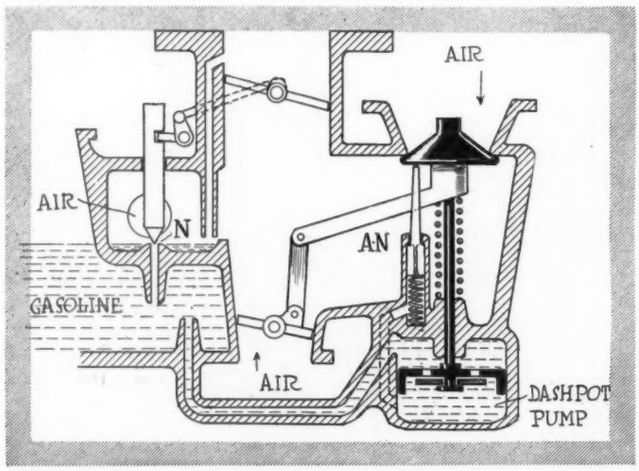


Fig. 14—Diagram Rayfield with main jet N, auxiliary jet A N controlled by air valve and dashpot pump for rapid acceleration

Longuemare Compensation

Another type of compensating jet carbureter is the Longuemare which is diagrammed in Fig. 13, the diagram not conforming accurately to the location of the parts in the carbureter, certain license being taken to make the explanation more simple. This carbureter has a starting nozzle *J* with the top of which registers a small slot in the lower part of the revolving throttle *T*, there being a small escaping slot in the upper part of the throttle. When the throttle is in this position the main nozzle *N* is not functioning. As the throttle is opened the large opening in it uncovers the air passages *P*, thereby bringing into action the nozzle *N* and leaving in operation the small starting nozzle *J*. At the start the gasoline well *W*, open to the atmosphere at the top, is filled with gasoline to the level of the nozzle *N*, but soon this surplus is exhausted and all of the supply must come through the fixed opening *FN* leading to the float chamber. When the gasoline is exhausted in the well *W* then air is drawn in through the top of the well, these air bubbles mixing with the gasoline issuing through *FN* and flowing with it to and through the main nozzle *N*. Thus do these air bubbles reduce the richness of the mixture at high speeds and bring about the desired compensating result. In this carbureter an exceptionally neat design is accomplished by having the adjusting needle for the opening *FN* in the middle of the float and having the gasoline well *W* surround it so that the two thus located concentrically form the vertical guide for the annular float.

A Mixed Division

LASTLY in this classification we come to three of the leading American carbureter types which it is difficult to classify and which do not strictly come under any of the four divisions already delineated. These makes are Stromberg, Rayfield and Kingston. Rayfield uses a metering pin, which pin is lifted as the throttle opens in the main jet *N*, Fig. 14, through a linkage diagrammed, and so establishes a right to be classified as a metering pin type, but it goes further: It incorporates an auxiliary nozzle *AN* which also has a metering pin which is depressed when the auxiliary air valve opens. Thus by having two distinct nozzles it establishes its right also to be classified as an expanding type of instrument. But Rayfield goes still further in that it combines a pumping action on the gasoline in the auxiliary

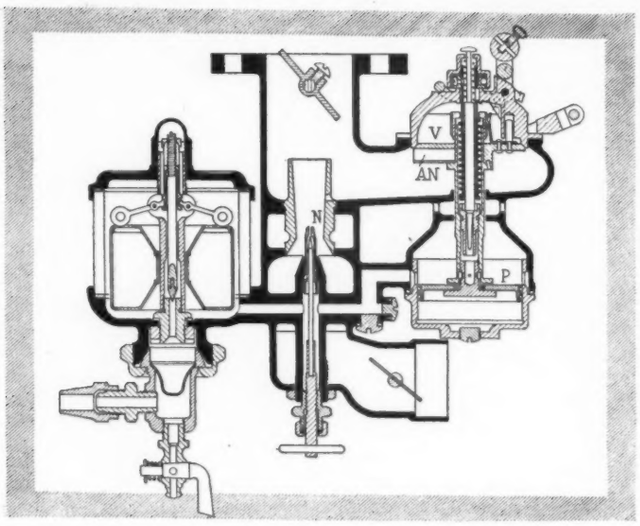


Fig. 15—Section Stromberg model K with main jet N and auxiliary jet A N in the air valve and controlled by it

nozzle *AN* whereby a very rich mixture is furnished for acceleration whenever the air valve is suddenly opened. This is accomplished by the piston on the lower end of the air valve stem, this piston working in a dashpot filled with gasoline. Gasoline enters the dashpot above the piston and is admitted to the space below the piston by the disk valve in the piston. When the air valve suddenly opens, forcing the piston downward, this disk valve is automatically closed, forcing or pumping the gasoline upward through the dotted fuel passage into the nozzle *AN*, where it is sprayed into the inrushing air. Only when the valve opens is this pumping function occurring and at other times the gasoline issues through this auxiliary nozzle according to the suction of the motor. Thus Rayfield is a compound of two metering pins in conjunction with the pumping function for acceleration.

A Stromberg Model

Under our classification Stromberg model K, Fig. 15, is a combination instrument incorporating a main nozzle *N* without any metering pin, having an auxiliary nozzle *AN* incorporated in the auxiliary air valve *V* and which nozzle is regulated by a metering pin shown in the lower portion of the valve stem. The valve *V* is carried on a piston *P* working in a dashpot filled with gasoline. As the valve opens downward the annular space around the pointed end of the metering pin is increased, increasing the flow of gasoline through nozzle *AN*. This measures the additional gasoline needed by the opening of the air valve. The air valve is closed by the spring indicated, the rapid upward closing of the valve being retarded by the slower movement of the gasoline above the dashpot piston passing around the piston to the space below it. Thus does this carbureter combine the features of two nozzles, the auxiliary nozzle including means for supplying gasoline for quick acceleration.

The Kingston Type

Lastly comes the Kingston, Fig. 16. It is a combination of the compensating jet type and also the weighted air valve design. Gasoline flow is regulated by a hand-adjusted needle valve *N* located in the bottom of a gasoline well, the level of which is shown at *W*. Into this well extends the lower end of a small air tube *T* which surrounds the needle valve stem. The normal air passage is obstructed by a hinged metal ball *V* forming a weighted air valve. When starting the motor this air valve remains seated as illustrated, all the air necessary being drawn up the small tube *T*, this tube sucking up a rich supply of gasoline. Soon the supply of gasoline in the well *W* falls below the lower end of the tube *T* and then only air or air mixed with gasoline vapor is drawn up the tube. With increasing motor speed the weighted air valve *V* is lifted off its seat and lifted as needed by the demands of the motor. In operation this carbureter is similar to the Holley excepting that it employs the weighted air valve which the Holley does not make use of. To classify the Kingston it might be regarded as a combination of the compensating jet and weighted air valve type.

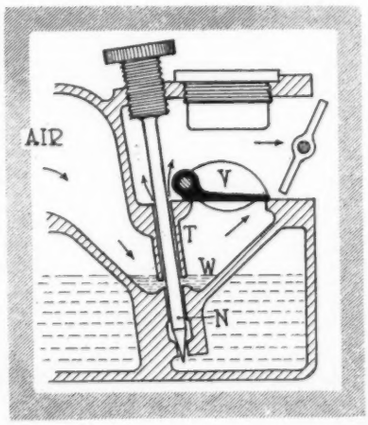


Fig. 16 (left)—Diagram Kingston with starting air tube around adjusting needle and weighted air valve

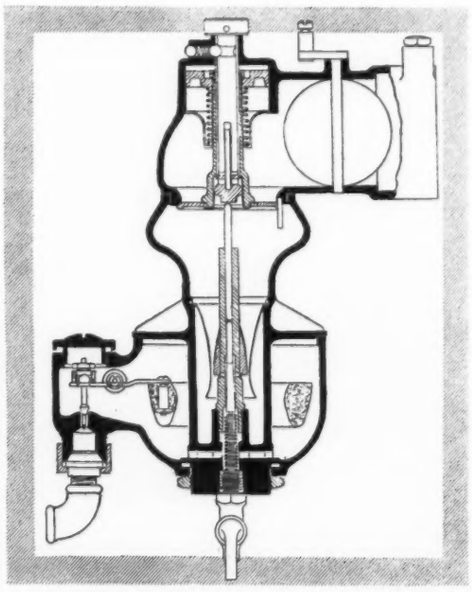


Fig. 17 (right)—Section new Schebler model T with auxiliary air valve controlling the metering pin

Other Carbureter Attachments

THIS concludes the classification of the various carbureters the majority of which are included, although there are some that it has not been possible to incorporate in this review for want of information.

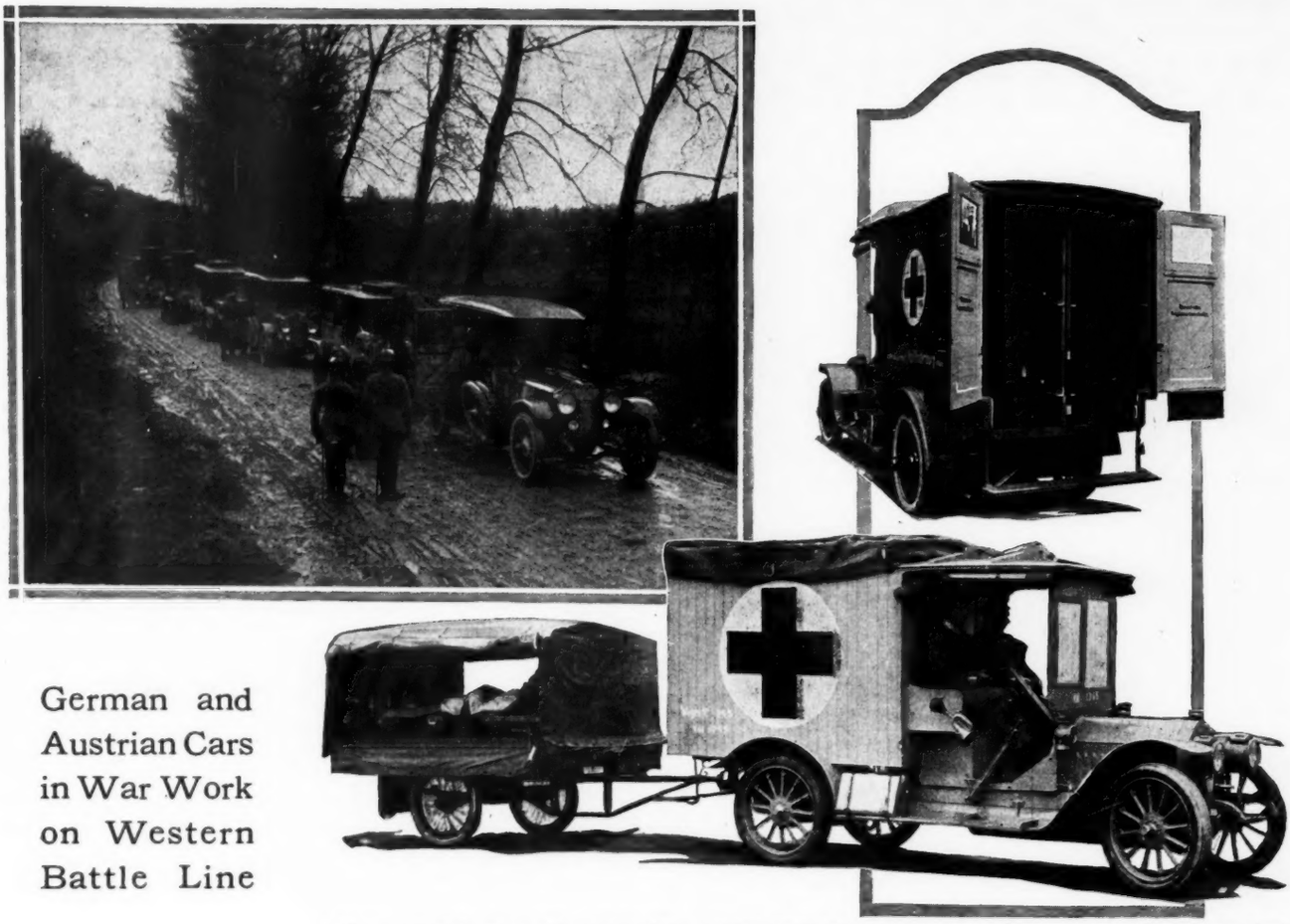
Many of these carbureters incorporate many devices which are not essential so far as the basic principles on which they are based are concerned but which play their part in making more efficient the general work of the instrument. Thus nearly all of them have some feature or other to facilitate starting. The problem of making starting easy in cold weather consists in getting commensurate flow of gasoline. When gasoline is cold it will not issue from a nozzle so rapidly as when it is warmer, thus in starting there must be furnished a larger orifice or opening in the nozzle or else the air supply must be temporarily restricted so that there is a stronger suction on the gasoline.

The customary way to accomplish this is by the shutter valve in the primary air passage. Practically shutting off this passage puts the entire suction on the fuel jet.

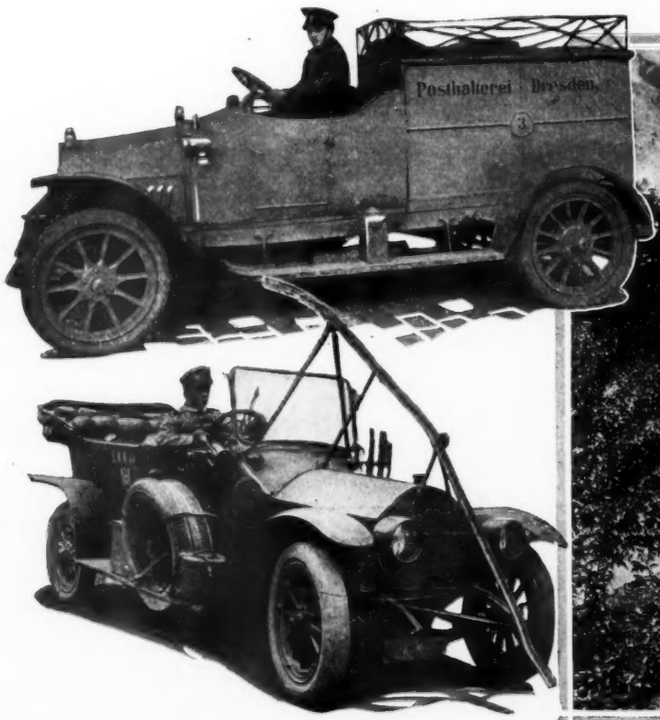
Those makers not following this plan have what is termed a by-pass which is a restricted passage leading from the nozzle or near it to a point above the throttle so that when the throttle is closed the engine suction is exerted on this small passage, thus securing the requisite supply of gasoline.

Stromberg uses a shutter valve in the main air intake; Schebler employs a similar valve; Rayfield uses a small by-pass channel to the manifold above the throttle.

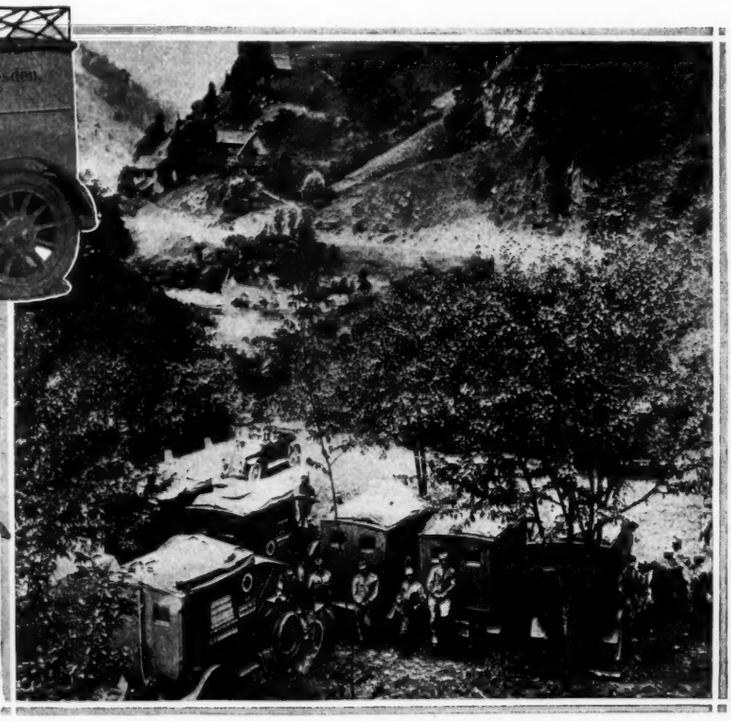
German and Austrian Cars in War Work on Western Battle Line



Above at left—Imperial automobiles constituting the cortege of the Kaiser. At right—German Red Cross ambulance presented to von Hindenberg's army. Note trailer attached



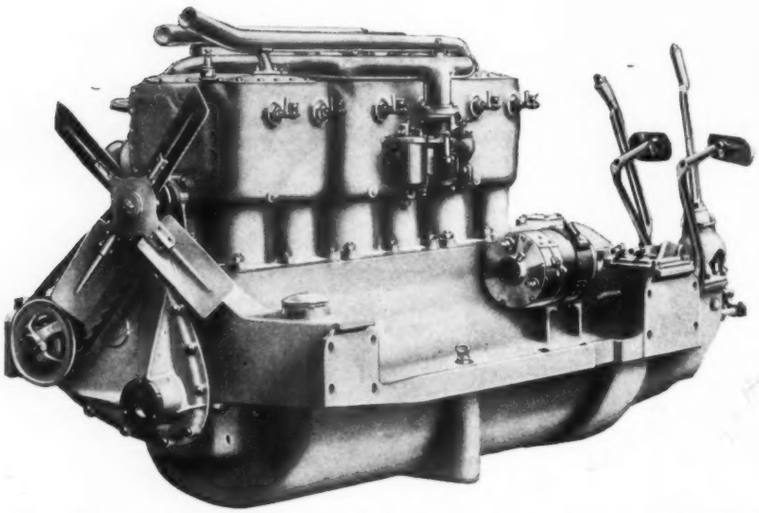
Above—One of the women post deliverers of Dresden, Germany. Below—Mercedes fitted with wire-cutting device for work at the front



A train of motor vehicles in the service of the Austrian army sheltered under trees while awaiting orders. Note the mountainous character of the country

Winton Has Two New Sixes

Chassis on Same Lines Has 33 Hp. or 48 Hp. Motor—Many Small Improvements



New Winton six motor, showing clean design and also mounting of starting motor and carbureter. Note pair-cast cylinders. The two new models are similar, the larger being 4½ by 5½ and the smaller 3¾ by 5¼

FOR 1916 the Winton Co., Cleveland, Ohio, will concentrate its energies upon two new models, both sixes. The larger has 4½ by 5½ in. bore and stroke and the smaller 3¾ by 5¼ in., both being similar in design. With seven-passenger touring bodies the respective prices are $3,500 and $2,285. There are nine bodies listed as standard equipment for each chassis, including practically all types, and the chassis are also obtainable without bodies at $3,000 for the larger and $2,000 for the smaller, while special inclusive prices are quoted for one chassis supplied with two bodies of different type.

Motor Is Neater

The outside of the motor has been cleaned up a great deal, though retaining the lines of former Winton engines. It is noticeable that the pair casting for cylinders is adhered to though the assembly is so compact that the effect is almost the same as that of a block casting. The upper half of the crankcase, which is divided horizontally in the conventional way, has as part of the casting, an aluminum tray which extends from end to end of the motor on either side. Thus the front portion of the chassis frame is completely filled by the crankcase which makes its own sod pan.

On these trays the electrical accessories are disposed very accessibly, the water pump being central on the right side with the magneto behind and Bijur generator in front. On the left side is the Bijur starting motor and the carbureter, which latter has a long intake manifold that is led over the top of the cylinders to a distributing pipe on the valve side of the motor. Both this part of the intake manifold and the exhaust branch are positioned so that they do not interfere with the accessibility of the valves, which are inclosed by the conventional type of cover plate.

In the bottom of the crankcase there is a plunger oil pump, driven by a vertical shaft which carries a skew gear meshing with a corresponding wheel on the rear extremity of the camshaft. This pump draws oil through a screen and delivers it to a main supply tube, cast in the crankcase, whence it passes to each of the four main bearings.

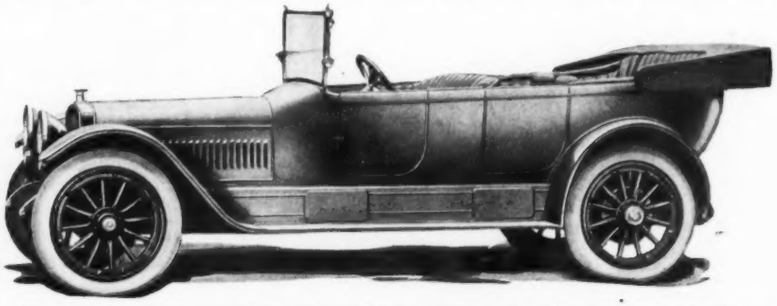
The use of four crankshaft bearings enables each crankpin to have a separate feed through oil holes drilled in the crankshaft, and the smaller moving parts of the motor are cared for by the spray of oil escaping from the main bearings and lower ends of the connecting-rods.

The distribution gearing at the front end is a silent chain passing over the crankshaft pinion, the camshaft sprocket and the generator pinion, and this chain is fed by a pipe that screws into the far end of the main oil supply pipe, thus being streamed with oil continuously.

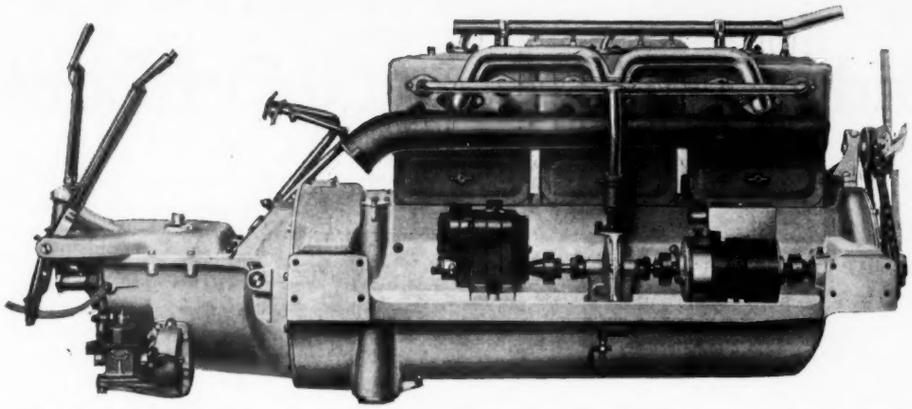
Balance Studied Carefully

The pistons exhibit no especial peculiarity, but are fairly light in section, and they provide the bearing for the wristpin which is fixed to the upper connecting-rod end. The connecting-rods also are the accustomed I-beam forgings, but the makers state that very special care is taken in weighing up the different reciprocating parts, so that the piston and connecting assemblies of each cylinder have the same mass reactions. For the crankshaft, which is 2 in. diameter, a very high tensile steel is employed, and the four bearings are most rigidly supported in the crankcase by spreading webs of metal backing the bearings. A detail which makes for efficiency in the motor is the use of constant acceleration type cams, and quietness is sought by the use of roller ended tappets. The head of the tappet is maintained in contact with the valve stem by a cushion spring, and it is noteworthy that the roller is considerably larger in diameter than usual, being 1¼ in. across by ¼ in. wide.

There are several other interesting details about the motor. For instance, there is a water passage completely around each cylinder, the two included in each casting being separate individually. Owing to the position of the water pump, high up and midway on the side of the motor, its delivery is easily so divided as to give an equal supply to each



New Winton seven-passenger six-cylinder touring car which sells for $2,285 as the smaller model and $3,500 as the larger



Right side of new Winton motor showing mounting of magneto and generator. Note mounting of tire pump on the side of the gearbox

cylinder block and, a conspicuous user's advantage, the glands are ideally accessible for adjustment.

The pistons have rings of a new pattern with step joint ends and there are three to each piston, no scraper ring being used. Priming cocks are supplied in each cylinder, with a cup for holding the necessary small quantity of gasoline and there is also a priming cock in the intake manifold. The placing of the Bosch dual magneto at the rear end of the cylinders allows the wires to be taken into the end of the conduit and so to be distributed with a minimum of exposed length.

The carbureter employed is a Rayfield and the fuel is raised from a tank of 21 gal. capacity at the end of the frame, by a Stewart vacuum feed.

Clutch Has Many Plates

The multiple disk clutch has alternate plates of steel and fabric, and very light pressure suffices to release it, owing to the extremely large surface given by the number of plates employed. It is entirely inclosed between the motor and gearcase, but an amply large hand hole gives free access to the spring.

In the gearset four forward speeds are provided with direct on third, and the top speed ratios are variable. For the large chassis the choice is of four different bevel combinations, the highest being 3.77 to 1 and the lowest 4.73 to 1. On the smaller car the higher of these two is not given, but each of the other three is available.

In the rear axle the driving gears are spiral bevels, and taper roller bearings are used throughout. The propeller shaft is open type and a torque stay is employed.

Springs are three-quarter elliptic at the rear, and take the driving stress, a feature being that both front and rear springs are supplied with the Dann insert which maintains lubrication between the leaves.

Bodies Avoid Extremes

In the bodies the designers have successfully aimed at modernity without adopting ultra-streamline forms. Hoods, cowls and body lines merge, but there is no attempt to make the section of the same shape throughout. On the touring cars there is a slight rise in the level of the side panels, the cowl being the lowest point and the rear seat the highest. A choice of either divided front seats or the old style is given, the price being the same for either. Another option is either wire or wood wheels and practically no limit is put upon the buyer's choice of color schemes.

Of course the equipment is complete to the last detail. The tires are 36 by 4½ in. on the smaller chassis and 37 by 5 in. for the larger.

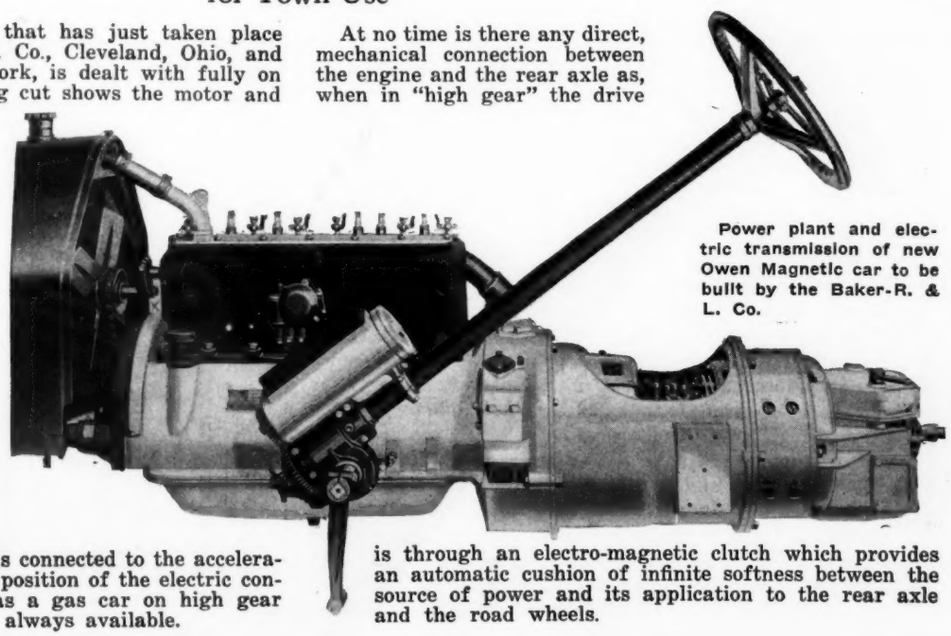
Owen Magnetic in Smaller Size Announced

New Model Is Intended Especially for Town Use

THE combination of interests that has just taken place between the Baker R. & L. Co., Cleveland, Ohio, and the Owen Magnetic Co., New York, is dealt with fully on another page. The accompanying cut shows the motor and electric transmission of the smaller chassis which will at once be added to the large Owen car the manufacture of which will be continued.

The new car is intended to be especially suitable for town use, having a six-cylinder 3½ by 5 in. motor and a steering lock that will allow the car to turn in 38 ft. despite its 126 in. wheelbase. The transmission will be just the same as that which has been used for the present Owen Magnetic, and the whole control is concentrated upon the steering column, as shown in the cut. From starting up the gas engine to braking, everything is controlled by a lever on the steering wheel, except the throttle of the carbureter which is connected to the accelerator pedal. When in the limiting position of the electric control the car operates precisely as a gas car on high gear except that the electric brake is always available.

At no time is there any direct, mechanical connection between the engine and the rear axle as, when in "high gear" the drive is through an electro-magnetic clutch which provides an automatic cushion of infinite softness between the source of power and its application to the rear axle and the road wheels.



Power plant and electric transmission of new Owen Magnetic car to be built by the Baker-R. & L. Co.

New England Tourist Gain 50 Per Cent

$25,000,000 Spent in the Past Summer by Automobile Parties—225,000 Cars and 675,000 People on the Road During July and August

By James T. Sullivan

BOSTON, MASS., Nov. 29—When it is estimated that some $25,000,000 was spent in New England the past summer by motor tourists; that there was a 50 per cent increase in the visitors over a year ago; that during the busy months of July and August some 225,000 cars carrying approximately 675,000 people were moving about day after day leaving a golden trail behind them, it is proof unquestioned that New England was not sidetracked for the San Francisco exposition, and that war did not have any effect on the automobile owners this season.

The writer has made a tabulation of figures each year for the past four seasons on motor car visitors to Massachusetts and New England, and this year the totals show a very substantial increase. In fact, there has been a gain of about 50 per cent in the Bay State visitors this year, which is rather remarkable.

An analysis of the totals for the four years from 1912 to 1915, inclusive, shows that the gain has been nearly 100 per cent, the addition of twenty-eight more cars being needed to reach that score. In four out of the six groups in which the visiting cars are divided the gain from 1912 to this year has been above 100 per cent. This proves the value of expending money on good roads when there are scenic attractions to draw the tourists. It would be hard for any other State—New York with its area and attractions, New Jersey with its Atlantic City and California with its exposition this year excepted—to excel Massachusetts in attracting visitors.

The figures for 1915 show that the motorists east of the Mississippi still kept their machines headed for the Atlantic coast, while those west of the big river were a bit inclined to go to the exposition. In other words, of the different groups, all of them except the far west combination showed a gain. This year there were thirty-four States represented, the same number as a year ago, for while four—Delaware, Mississippi, Arizona and Oklahoma—dropped out, a similar number were added—Arizona, New Mexico, South Carolina and West Virginia. There were cars also from five foreign countries this season.

1310 Registered in Bay State

In the total compilation of machines registered in Massachusetts for the summer months it was found that there were just 1310. It must be remembered that these machines belonged to people who came to stay more than a month. Now for each car that is so registered by an owner who comes here to stay there are scores of machines which are never registered. If one were to make an estimate and say that for each car so registered there are at least fifty machines traveling about that do not have to register it would not be putting the figures too high. And that would give 65,500 such cars added to the 1310 registered ones. Assuming that 66,810 machines came to Massachusetts, each carrying three passengers, we have 200,430 motorists from outside the Bay State who were welcomed here last summer.

To get some idea of what this means one must remember that Boston is particularly fortunate in its situation to attract motorists. It is a central point for tourists that cannot be overlooked. If they come in through the Adirondacks, Canada, the Green or White mountains they gravitate down to the ocean and Boston. From that point there are many places of historic interest to keep them a few days. Then they pass on their way West and South. If they come along the coast or through the Berkshires again Boston is the destination, for through that city the path lies to the famous North Shore where the Atlantic is seen at its best, and then on up to the mountains.

So when one takes the figures for Massachusetts he takes the tone representative of all New England. The other States get a large proportion of the tourists that visit the Bay State, perhaps 85 or 90 per cent, but Massachusetts gets about 99 per cent of all who visit the five other New England States.

Spend $600,000 a Day

Therefore if more than 200,000 motorists from outside Massachusetts entered her domain last summer it meant that they were spending at least $600,000 a day on their touring. And limiting them to some ten days or so in the Bay State there is $6,000,000 scattered about. Now if they spent an equal sum among the other States—that is, figuring that 50 per cent of the tour was in the Bay State and the rest in one or all of the others—it gives a total of $12,000,000 from summer tourists.

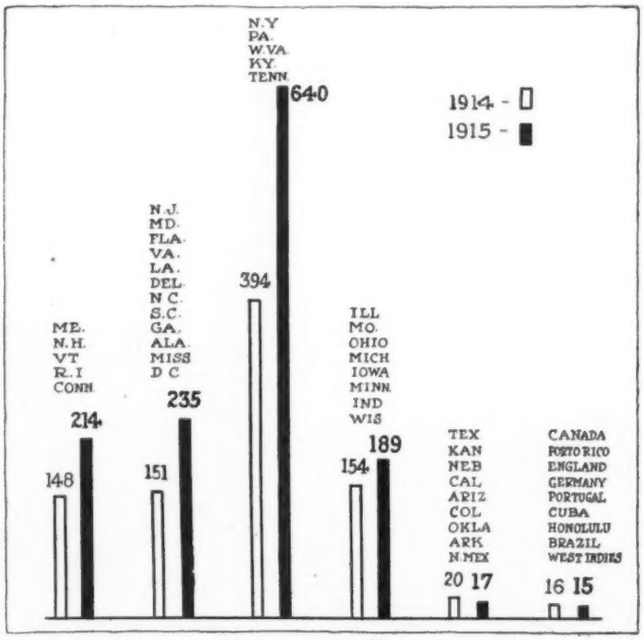
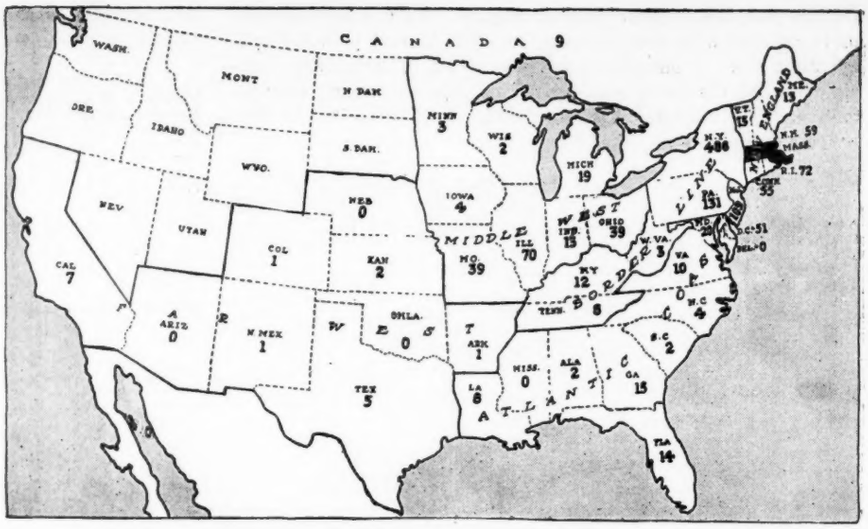


Diagram showing the comparative representation of various States and countries among the automobile tourists in Massachusetts during the past Summer and that of 1914

But that is not all. Take the motor cars owned in New England, numbering about 175,000, as an additional total. They were out every day with their owners and families or friends, and placing the average passengers at the low figure of two for a car, there were 350,000 more people on the New England highways. And living at home they did not all have hotel bills to pay, so the cost of each for a day may be put down for $1, the price of a few sodas, cigars, etc., and you have an expenditure of $350,000 a day. Assume that the great majority has but two weeks vacation and it was spent touring, the cost would roll up to that time about $5,250,000. But there are Sunday and holiday tours in summer. From May 1 to Oct. 31 there are five holidays in Massachusetts. There are at least four Sundays to a month so that would mean twenty-four more. Eliminate three Sundays and say two holidays and class them in the vacation period and a couple of Sundays for bad weather and there still remains at least twenty real out-of-doors days in which motorists spend money. It gives you a total of some $7,000,000. Here is a summer's total reaching $24,750,000 in New England alone, an entire section of country smaller than any one of several Western States. Certainly, with the money spent by the wealthy people who come to Massachusetts or other New England resorts for long stays and that spent on odd days an estimate of $25,000,000 for the summer months is not excessive.



Map of the United States showing the number of cars in each state which traveled over the Massachusetts roads in the past summer

Comparison by Groups

In past years the writer has divided the various sections into groups and the figures allow an admirable comparison. The New England group comprises the cars from the five other States that registered with our Highway Commission for lengthy stays. All the States except Maine show a gain this year so that the figures run to 214 when last year they were 148, that is sixty-six more. Here they are:

New England Group

	1912	1913	1914	1915
Maine	3	6	16	13
New Hampshire	12	10	41	59
Vermont	2	4	4	15
Rhode Island	42	42	57	72
Connecticut	43	43	30	55
Totals	102	105	148	214

Next, we have the States along the Atlantic coast from New Jersey to the Gulf. Here again there is a pronounced increase. There are eleven States in the group. Eight show a gain, two a loss and one is similar to the figures of a year ago. There were 151 machines registered last season and this year the total jumped to 235, a gain of eighty-four. This shows that in the number of States increasing their figures meant some 75 per cent, and in machines registered it went above 50 per cent. New Jersey and District of Columbia were the big gainers. Here are the figures:

Atlantic Coast Group

	1912	1913	1914	1915
New Jersey	56	80	64	109
Maryland	17	16	17	20
Florida	3	8	7	14
Virginia	5	5	8	10
Louisiana	4	3	6	8
Delaware	..	2	1	..
North Carolina	..	2	5	4
South Carolina	..	2	..	2
Georgia	1	2	7	15
Alabama	2	..	2	2
Mississippi	..	..	1	..
District of Columbia	12	23	33	51
Totals	100	143	151	235

The next section is divided into what is termed the Border States and while numerically they number less than any other group except New England the totals are far greater. That is because New York and Pennsylvania are included.

Non-Resident Tourists Visiting Massachusetts

	1912	1913	1914	1915
Alabama	2	0	2	2
Arizona	0	0	1	0
Arkansas	0	0	0	1
California	7	4	4	7
Colorado	2	0	1	1
Connecticut	43	43	30	55
Delaware	0	2	1	0
Florida	3	8	7	14
Georgia	1	2	7	15
Idaho	0	0	0	0
Illinois	39	45	56	70
Indiana	3	7	9	13
Iowa	2	5	3	4
Kansas	1	9	4	2
Kentucky	4	9	4	12
Louisiana	4	3	6	8
Maine	3	6	16	13
Maryland	17	16	17	20
Michigan	15	13	18	19
Minnesota	2	4	4	3
Mississippi	0	0	0	0
Missouri	40	41	39	39
Montana	0	0	0	0
Nebraska	4	3	0	0
Nevada	0	0	0	0
New Hampshire	12	10	41	59
New Jersey	56	80	64	109
New York	209	220	300	486
New Mexico	0	0	0	1
North Carolina	0	2	5	4
North Dakota	0	0	0	0
Ohio	40	29	21	39
Oklahoma	0	0	1	0
Oregon	0	0	0	0
Pennsylvania	78	80	81	131
Rhode Island	42	42	57	72
South Carolina	0	2	0	2
South Dakota	0	0	0	0
Tennessee	6	5	9	8
Texas	8	10	9	5
Utah	0	0	0	0
Vermont	2	4	4	15
Virginia	5	5	8	10
Washington	0	0	0	0
West Virginia	0	1	0	3
Wisconsin	1	2	4	2
Wyoming	0	0	0	0
District of Columbia	12	23	33	51
FOREIGN				
Canada	2	3	7	9
Porto Rico	2	4	3	2
England	0	1	1	1
Germany	0	0	1	0
Portugal	0	0	1	0
Cuba	1	1	3	2
Honolulu	1	0	0	0
Brazil	1	0	0	0
West Indies	0	0	0	1
Totals	670	744	882	1,310

Of the five States four showed a gain. New York was the more notable with 486, a jump from 300 of last year. Pennsylvania went from eighty-one to 131, and Kentucky, considering its distance, made a triple advance from four to twelve. The total for 1915 was 640. Last year it was 394, a remarkable jump. The totals follow:

Border Line Group

	1912	1913	1914	1915
New York	209	220	300	486
Pennsylvania	78	80	81	131
West Virginia	..	1	..	3
Kentucky	4	9	4	12
Tennessee	6	5	9	8
Totals	297	315	394	640

The Middle West group comprises the States in the section about the Mississippi Valley. There are eight States included in it and five of them, a majority, did better than a year ago; two lost and one was even.

Middle West Group

	1912	1913	1914	1915
Illinois	39	45	56	70
Missouri	40	41	39	39
Ohio	40	29	21	39
Michigan	15	13	18	19
Iowa	2	5	3	4
Minnesota	2	4	4	3
Indiana	3	7	9	13
Wisconsin	1	2	4	2
Totals	142	146	154	189

The Far West group comprises the States beyond the Mississippi. It was expected that if there were any loss it would be in that region, due to the exposition. And that is where the loss occurred. But it was not so very great. There are nine States in the list. This is the first year that Arkansas and New Mexico are included and they balance up for the loss of Arizona and Oklahoma. Of the nine, Texas and Kansas show a loss, while California, the most distant, shows a gain. There were twenty cars on the list a year ago and this season the figure is seventeen, a drop of three. The figures follow:

Far West Group

	1912	1913	1914	1915
Texas	8	10	9	5
Kansas	1	9	4	2
Nebraska	4	3	..	..
California	7	4	4	7
Arizona	..	..	1	..
Colorado	2	..	1	1
Oklahoma	..	..	1	..
Arkansas	..	..	..	1
New Mexico	..	..	..	1
Totals	22	26	20	17

The final group comprises the cars outside the United States known as the foreign section.

Foreign Group

	1912	1913	1914	1915
Canada	2	3	7	9
Porto Rico	2	4	3	2
England	..	1	1	1
Germany	..	..	1	..
Portugal	..	..	1	..
Cuba	1	1	3	2
Honolulu	1	..	..	..
Brazil	1	..	..	..
West Indies	..	..	..	1
Totals	7	9	16	15

When these groups are all placed together it shows that there were 1310 machines listed this year, while last year the figures totaled 882, or a gain of 428, as follows:

Totals for All Groups

	1912	1913	1914	1915
New England	102	105	148	214
Atlantic Coast	100	143	151	235
Border line	297	315	394	640
Middle West	142	146	154	189
Far West	22	26	20	17
Foreign	7	9	16	15
Totals	670	744	882	1310

Places Represented

Number of States	30*	32*	34*	34*
Foreign Countries	5	4	6	5

*Includes District of Columbia

To Make Hydromotors in Los Angeles

LOS ANGELES, CAL., Dec. 9—A factory is to be built in this city for the manufacture of Hydromotors. The company is now applying for articles of incorporation under the laws of California.

The experiments with the Hydromotor at the Panama-Pacific International Exposition were successful enough to prove that a land and water automobile was a practical possibility. During the closing week of the exposition, six voyages were made on San Francisco Bay and once the automobile launch ventured out of the yacht harbor.

A. Maini, president of the company which put out the first model, announces that the factory will be located in southern California. G. Lopizich, president of the International Bank of Los Angeles is to head the new company which will manufacture these land and water automobiles.

More than a year ago, the Board of Trade of Lankershim, Cal., offered the company a manufacturing site. A site has now been offered at Wilmington, the Los Angeles Harbor, and it is probable that the site will be accepted as at Wilmington, the location will provide for the testing of machines on both land and water.

According to the present plans of the corporation's backers, four models are to be offered. A two-passenger roadster, a seven-passenger touring car, a light delivery truck and seven-passenger limousine. The same chassis is to be used for each type of body. The limousine is to sell for $3,000 and the roadster at $2,000 with the touring car and truck coming between these figures.

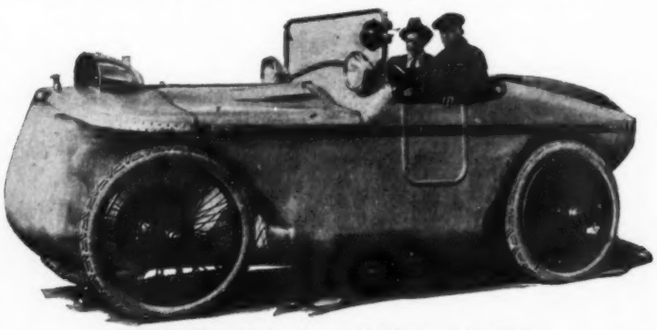
The machine shown at the exposition weighs 3000 lb. The body is of aluminum. All the joints are made water tight. To insure this condition, 2-in. brass bands are riveted to the edges. The length of the car is 16½ ft. In the water the machines is propelled by a 16 in. screw propeller. The wire wheels measure 42 in. in diameter.

In the water a patented bronze sliding device locks the water out of the axle housing.

The first machine is propelled by a 6-35 Haynes engine hung on a special chassis.

A ventilator at the prow and a small opening on the forward deck, allows enough air circulation to keep the engine cool. Gear levers at the right of the steering post allow the driver to shift the power from the wheels to the screw when the machine begins to float. Both the wheels and the propeller may be operated at the same time.

A sleeve engages a pin on the steering post which provides for change of steering control, automatically locking the front wheels and engaging the rudder. A reverse of the operation releases the wheels and disengages the rudder.

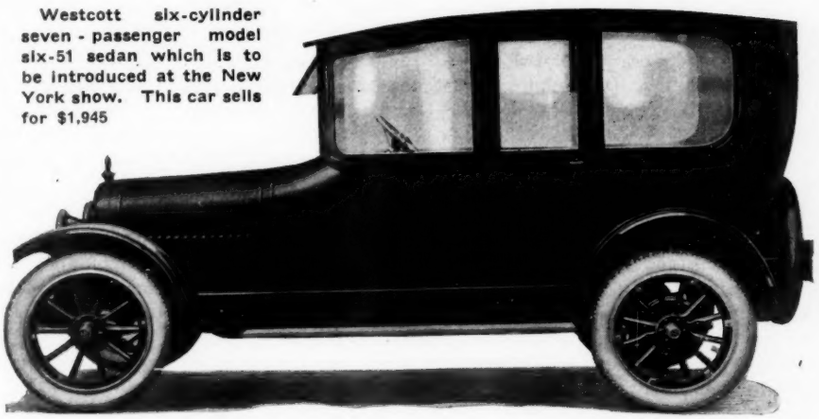


The Hydromotor—an amphibious automobile

Westcott Adjusts to Suit Driver

Two New Sixes Announced—Sedan Top for Touring Car—Lightness Studied

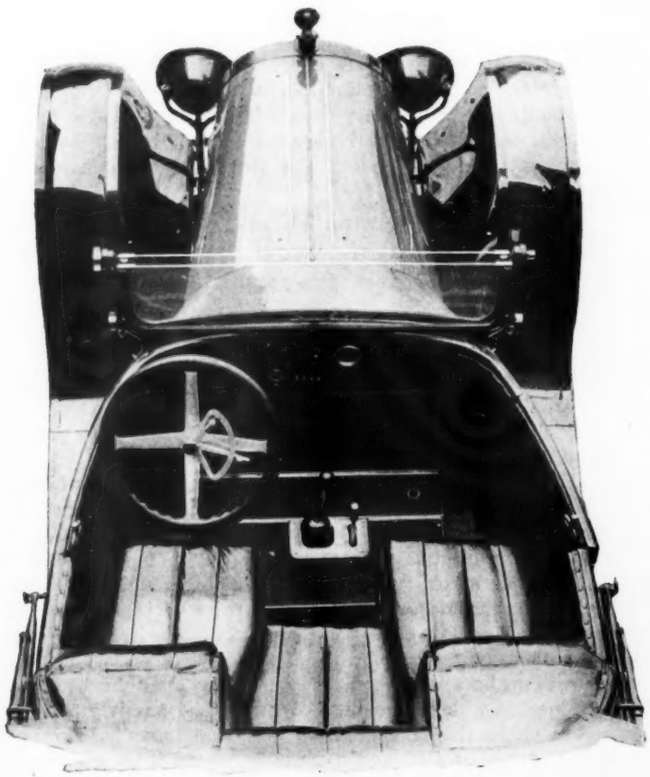
THE two new Westcott cars made by the Westcott Motor Car Co., Richmond, Ind., are both sixes, one a little larger than the other, being intended for seven-passenger bodywork. In design the two are similar, the same motor, a Continental 3½ by 5¾ in., being used for both. The respective wheelbases are 121 in. and 126 in. and the longer chassis has larger tires. Prices are $1,945 for the seven-passenger sedan, with an alternative choice of open touring or three-passenger roadster bodies at $1,595. The short chassis has similar open bodies, at $1,445, but with a maximum of five-passenger capacity, and also a cabriolet, for $1,746.



Westcott six-cylinder seven-passenger model six-51 sedan which is to be introduced at the New York show. This car sells for $1,945

Sedan Has Special Windshield

Particular pains have been taken with the sedan car, which is convertible to an open touring type. When the two portions are joined together, the upper structure has no overhang where it meets the sides of the lower part, and one of the greatest difficulties with demountable top bodies, that of making a good join around the windshield, is overcome by supplying a special shield for the closed car and utilizing it as one of the main, basic attachments. Two bolts suffice to make the attachment, the shield detaching from the brackets that hold it in place.



Driver's compartment of new Westcott model six-42 roadster, showing seating arrangement. This car lists at $1,445

The interior of the demountable top is finished in accordance with proper limousine style with good grade cloth, silk curtains, etc.

Adjustable Driving Position

On the roadster and cabriolet bodies the clover-leaf seating arrangement is adopted, and it can be seen from the plan view that the seats have been so disposed that the middle passenger has plenty of elbow room without the driver being pushed so far to the left that he has to sit sideways to the steering wheel, as has happened in some similar designs. Further, the comfort of the driver is studied by giving no less than a 6-in. adjustment on either pedal, and so mounting the steering column that it can be moved to suit the driver's length of arm. These adjustments give practically the same effect as an adjustable seat, without calling for extra weight in the body which is necessary to enable a sliding seat to be made rigid.

A special point is made of the quality of the leather used for upholstery, which is an enameled finish variety. It is fitted without buttons, which, in conjunction with the smooth surface, makes it very easy to keep perfectly clean.

Lubrication Simplified

Another, and quite different way in which the Westcott engineers have studied the convenience of the driver, is in the disposition of small parts requiring attention, and one result of this is that there are only five greasers under the body.

Lightness has been studied, and the motor has pistons and cylinders as the only cast iron parts, the whole crankcase being aluminum. The rear springs are cantilevers of chrome-vanadium steel and are 52 in. long; very short shackles are used at the front ends of these springs, this being claimed to eliminate roll while not affecting any riding quality. The chassis has a unit power plant and Timken axle equipment, with open type driveshaft and a double torque arm.

Accessory equipment includes a clock, dome lights in the sedan, double tonneau lights and, on the touring cars, a special fitting for stowing the Jiffy curtains wherein they are held by springs and cannot rattle.

Altogether the Westcotts are excellent examples of how an assembled chassis can be made a car of decided character.

The Rostrum

Gasoline Plus Chamois Gives Electricity

EDITOR THE AUTOMOBILE:—Am sending you herewith a clipping from the Timken magazine, House Organ of the Timken Detroit Axle Co. which in part reads as follows:

Let us assume that you are about to fill your tank. The funnel is in the nozzle. A chamois strainer is in the funnel. The gasoline is turned on and as it pours through the chamois it generates static electricity. Static electricity may be defined as electricity that is at rest.

Static electricity, as we have said, is now in the funnel. The funnel is charged with it. So long as the funnel fits securely into the mouth of the tank, thus creating a "ground," you are safe.

Now, let us assume that you did not allow the funnel to rest inside the nozzle of your tank, as the gasoline seeped through the chamois skin. Either yourself or someone else held the funnel in midair, or it rested free of the sides of the tank. No "ground" was formed.

We have seen that gasoline, a volatile substance, passing through chamois forms static electricity, which charges the funnel. When the amount of electricity is sufficient to produce a jump spark, that spark, jumps to the nearest "ground," which is your tank. In doing so it must pass across the opening between the end of the funnel and the edge of the tank through which gasoline vapor is rising.

The moral to be derived from this article is this: DO NOT PUT GASOLINE THROUGH CHAMOIS SKIN. But if you will insist on taking chances, be sure that you have a "ground" on it, by seeing that the funnel touches the opening of the tank. Be doubly sure that you take this precaution.

Would you please give us the best advice on this subject through THE AUTOMOBILE?

Newfoundland, N. J. R. E.

—The article which you cite was from information furnished to the Timken magazine by Henderson Bros., of North Cambridge, Mass. who recently nearly suffered the loss of a relative through the combination of circumstances mentioned. The fact that static electricity is generated by the pouring of gasoline through chamois seems to be clearly demonstrated. To secure the view point of the Henderson Bros., on this subject THE AUTOMOBILE received from them a letter of which the following is a copy:

"This accident happened to my son, and as there was no possibility of anything except static electricity we went into the matter a little more thoroughly than seemed necessary after it had happened. We found the fact to be known to most fire chiefs that gasoline and chamois was a fatal combination, but none of them could explain the reason why. At a consultation with one of the leading electrical engineers in Boston, and by experimenting we found that this static electricity was dangerous only when the funnel, or the pipe was not grounded, and this was caused in three ways. First, as in the Timken magazine, that is the funnel resting on the wood making a perfect insulated funnel; and the second condition was, when filling the funnel and the tank becomes nearly full, it is the custom to hold the funnel outside the tank, the gasoline running through the funnel and when the funnel touches the tank it again forms a spark of static electricity.

"We also had a long talk with young Mr. Firestone when he was here, and he informed us that his brother was burned to death in a garage accident. You might possibly get some added information from the Firestone family in regard to this accident. There have been four fatal burnings in and around Boston since my son's accident which was directly attributed to static electricity forming in the funnel. The more that this particular thing is impressed on the automobile public, the less chance there will be of repeating these accidents. If we have been instrumental in stopping that condition anywhere, we will have been amply repaid."

Renault Cover Plate Threads Worn

Editor THE AUTOMOBILE:—In my Renault's transmission the threads which support the back plate are all worn. New threads have been replaced and after about 100 miles the threads became worn out again so that no hold whatever can keep the plate to the larger part of the transmission. On account of the same trouble the high speed cannot keep in place but slips out causing a sort of noise as if some part of the car had dropped off. Could you instruct me how to repair this and if possible give me diagram?

Barranquilla, Colombia. R. I.

—From the information you give it is surmised that you refer to the back plate in the gear box. To make a satisfactory job the holes where the studs are fitted should be filled up with aluminum alloy and new studs fitted in. This work should be handled very carefully as otherwise, the gearshaft will be pulled out of parallel. If there is a Renault service station in your location the work should be done there.

Wants Data on Farm Tractors

Editor THE AUTOMOBILE:—Will you kindly answer the following questions in regard to motor farm tractors in the Rostrum:

1—What power is needed in a gasoline tractor to pull four 16-in. plows?

2—Can a tractor wheel of 30 to 32 in. in diameter have as much traction or pulling power as a larger wheel, assuming the vehicle is run at the same speed and with the same power applied?

3—Has a tractor got as much pushing power as pulling power or would the maximum load vary according to whether it was pushed or pulled?

4—Could an electric generator powerful enough to start a 40 to 45 hp. motor run an electric motor requiring about 3 hp.? What would be the wholesale price of such an apparatus?

5—Is there any way to transmit power between two points, the distance between which is constantly changing, except by the use of a flexible cable? Would it be possible to construct a cable strong enough to transmit from 3 to 5 hp. over a distance of 4 ft. and if possible, would it be practical?

6—Kindly publish a formula whereby I can calculate the pulling power at the drawbar of a tractor when the weight,

horsepower of the motor and the distance between the motor and the center of the driving wheels are given.

Red Wing, Minn. N. L. W.

—This question cannot be answered definitely without much other data such as the weight of the tractor; the method of drive and the power loss therein; the drawbar pull of the unit; the approximate weight of the plows and platform; the depth of the furrow and the condition of the soil. However, THE AUTOMOBILE can cite you one of several makes of tractors now on the market which will pull four 16-in. plows. The Knapp tractor, made by the Rochester Gas Engine Co., Rochester, N. Y., is a three-wheeled, gear-driven unit weighing about 8750 lb. and equipped with a four-cycle four-cylinder gasoline motor of 4¾ in. stroke and 6¾ in. bore, developing 36.15 S. A. E. hp. This power is sufficient to pull four 16-in. plows and platform and give a depth of furrow of 6 to 10 in., varying with the condition of the soil.

2—With no slip, the pulling power of a wheel varies inversely as the diameter, the power applied and the gear reduction remaining a constant, or the smaller the wheel, the greater the pulling power. But in your case, assuming the same vehicle speed and a change in gear reduction, a 30- or 32-in. wheel would have no greater pulling power than a larger wheel, provided it did not slip. Here other practical considerations come into play, such as the condition of the soil, the coefficient of friction between the wheel and the ground and the pressure per square inch of the wheel on the soil due to the weight of the vehicle and its load. From these considerations, it may be deduced that greater pulling power may be obtained by the use of large wheels with the power applied and the vehicle speed remaining constant, because they give a larger area in contact with the ground and prevent slipping or sinking into the soil. They also mount obstructions much more easily than smaller wheels.

The relation between the pulling power of a vehicle and the diameter of the driving wheels is shown in the formula given below:

$$VC = \frac{8.4\ nb^2sR}{DW} \times em \times et$$

Where VC = Tractive factor or vehicle coefficient.
n = The number of cylinders
b = The bore in inches
s = The stroke in inches
R = The gear reduction
D = The diameter of the driving wheels in inches
W = The total weight of vehicle and load in pounds
em = The efficiency of the motor as compared with the S. A. E. rating as unity
et = The efficiency of the transmission system, *e.g.*, the percentage of the power developed which reaches the driving wheels.

The above formula was derived by C. T. Myers, mechanical engineer, Detroit, Mich., for the purpose of comparing motor vehicle performance. It shows the very important inter-relation of the motor displacement, the gear reduction, the diameter of the driving wheels and the total weight carried. It also shows how very important the reduction of weight becomes and the marked effect of an increase in the gear reduction.

3—On a perfectly level road any motor vehicle has as much pushing power as pulling power, but as there are no such roads in existence, this equality does not hold and the pulling power exceeds the pushing power. The path of a farm tractor over rough and uneven fields is one continual process of lifting the vehicle wheels over small obstructions, and as it takes more power to push a wheel over an obstruction than it does to pull it over, the vehicle can pull more than it can push. The reason why it takes more power to push a wheel over an obstruction than it does to pull it over, may be best understood by analyzing the forces which comes into play.

The force transmitted to the driving axle of the vehicle may be shown graphically by a horizontal line parallel with the ground. As soon as the front wheels strike an obstruction, a portion of this force is resolved along a line from the point of application on the driving axle to the point where the front wheel touches the obstruction. The remainder, resolved at right angles to the latter force, tends to raise the wheel up and over the obstruction. This lifting force acts on an imaginary bellcrank lever, the fulcrum of which is at the point where the wheel strikes the obstruction and whose arms extend from the fulcrum to the center of the wheel hub and to the point of contact of the wheel on the ground.

The lifting component of the total force acts on the arm of the lever between the fulcrum and the center of the wheel hub at distances proportional to the distance from the fulcrum to the point of application of the total force on the driving axle of the vehicle. The nearer the driving axle is to the fulcrum, the greater is the leverage of the lifting component of the force about the fulcrum. The greater the leverage, the easier is it for the wheel to mount the obstruction.

In the case of a tractor pushing a trailer, the driving axle would be further away from the fulcrum than if the trailer were pulled, and for this reason the leverage of the lifting component of the propelling force would be less, thus making it harder to push the trailer over the obstruction than to pull it.

This principle is shown in Fig. 1, which illustrates the analagous case of a front- and rear-wheel-driven vehicle. In the case of the front-wheel-driven vehicle, *ab* represents the force propelling it along a level road. When it strikes an obstruction, such as *D*, the force *ab* may be resolved perpendicular to and parallel with the line *ED*, *D* being the point of contact of the wheel and the point about which the wheel must be lifted so that the vehicle may continue on its way. *D* is the fulcrum about which the resolved lifting component *ac* of the force *ab* is applied.

In the case of a rear-wheel-driven vehicle the same force *ab* is applied along the line *eD*, this line continued passing through the point of application on the driving axle. The force *eg* is equal to *ab*. Its lifting component *eh*, however, acts about the fulcrum *D*, at a distance *ef*, which is less than *ad* in the case of the front-wheel-driven vehicle. Therefore, in the first case, $ad \times ac$ is greater than $eh \times ef$ in the second case, because whereas *eh* and *ac* are equal, *ad* is greater than *ef*. Thus a front-wheel-driven vehicle may pass over obstructions with greater ease than a rear-wheel-driven type.

4—Yes. The wholesale price of a 3-hp. direct-current motor-generator set would be about $150.

5—THE AUTOMOBILE knows many other methods of transmitting power betwen two points, the distance between which is constantly changing, besides that of a flexible shaft, as follows: Electric current; hydraulic circulation; compressed

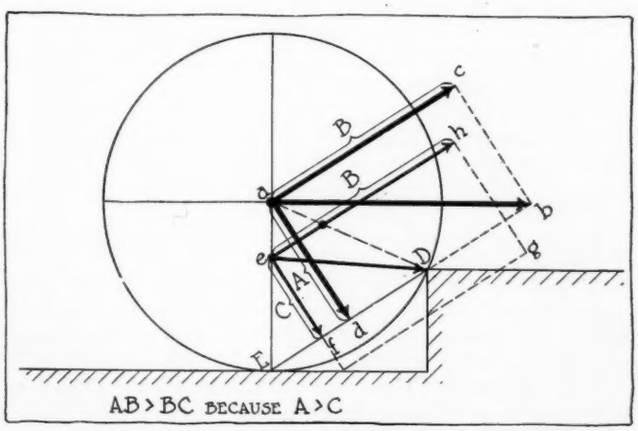


Fig. 1—Diagram showing effects of wheel diameter

air; vacuum; a scissors-shaped frame using any one of a number of forms of transmission, such as trains of spur gears, belts and pulleys, chains and sprockets, bell-cranks and connecting rods, etc. Transmitting 3 hp. through a flexible shaft 4 ft. long is practicable, providing the speed of the shaft is not excessive.

6—Comprehensive tests with motor trucks have shown that the average motor truck when full loaded develops a drawbar pull equal to about one-quarter its gross weight; *i.e.*, weight of vehicle and load. This ratio is changed by road conditions and grades.

According to George Watson, of John I. Thornycroft & Co., Basingstoke, England, drawbar pull may be calculated by the two following formulae as published in Vol. 1 data sheets of the *Society of Automobile Engineers:*

$$T = \frac{n \, Horsepower \, 375}{V}$$

Where T = Tractive effort in pounds
V = Velocity of vehicle in miles per hour
n = Efficiency of gearing. Take 0.9 for each gear
and

$$T = W\left(R + \frac{2240}{m}\right)$$

Where T = Tractive effort in pounds
W = Gross weight of vehicle and load
R = Resistance to traction in pounds per ton of 2240 lb.
For loose sand, $R = 560$; for hard, dry clay, $R = 100$
m = Gradient, 1 in M. For instance, when grade is 1 in 5, $m = 5$.

It will be observed that these formulas contain the weight and the horsepower of the motor. The distance between the motor and the center of the driving wheels has nothing to do with the drawbar pull except that it might affect the efficiency of the power transmission, but this is covered in the first of the two formulas given.

Power Strokes of Eights and Twelves

Editor THE AUTOMOBILE:—In an eight- and twelve-cylinder motor how many power strokes to one revolution of the crankshaft?

2—How many strokes does the piston make to one of crankshaft, of the eight and twelve-cylinder motor?

3—How many revolutions does the crankshaft make to one of the cams?

4—How many degrees are the S. C. P. and E. strokes apart?

5—Recently my car has been giving me quite a little trouble. The battery is all right. When I put my foot on the starting pedal it will not crank the motor, if I use the crank handle and turn the motor over about eight times, then if I use starting pedal, it cranks the motor all right. At the same time, the motor runs in good order.

6—Kindly tell me how to adjust the brakes on the rear wheels?

Jersey City, N. J. S. B. S.

—Four power strokes to a revolution in an eight and six power strokes to a revolution in a twelve.

2—There are always two strokes to a revolution regardless of the number of cylinders for each piston.

3—The cams always operate at one-half crankshaft speed in a four-cycle motor.

4—This depends upon the individual timing. It will generally happen that the intake valve will open somewhere near 5 deg. past upper dead center and close at somewhere near 25 deg. after lower center and the exhaust valve will open about 35 deg. before lower center and close at just a little past upper dead center.

5—It may be possible that there are some short circuits which are draining the battery or it may be that the generator is not charging properly. Be careful to keep the specific gravity of the electrolite in accordance with the instructions of the battery maker.

6—You do not mention the make of car therefore it is impossible to give specific information. The brake adjustment should be tightened sufficiently to give a firm application of the brake without allowing the brake bands to drag on the drums when the car is in ordinary use.

No Colored Running Lights Prescribed

Editor THE AUTOMOBILE:—Please publish which is the correct placing of red and green side lights on cars? Also the relative visibilities of number on license plates; e. g., black on white, white on black, red on white, etc., etc. A list appeared some time back.

Atlanta, Ga. E. McD.

—There is no such thing as the correct placing of red and green side lights on cars as the rules of the United States Government on the carrying of correct marine running lights do not apply to any form of land vehicle.

THE AUTOMOBILE has no record of any such list as you mention.

Packard Made 102.25 M.P.H.

Editor THE AUTOMOBILE:—What rate of speed did the Packard Twin Six make at a trial some few weeks ago?

2—Was this equipped with regular gear ratio as well as a regular stock motor or were there special gears used in this test?

Jeromeville, Ohio. C. L. E.

—As stated on page 847 of THE AUTOMOBILE for Nov. 4, the Packard car you mention made 102.25 m.p.h.

2—The gear ratio was changed. This was a stock car in every particular except that it used a racing body, the timing was changed for high-speed work, the pistons were arched on top to give higher compression, a double Zenith carbureter was used and the rear axle was geared to give 34 m.p.h. at a crankshaft speed of 900 r.p.m.

Burman's Record Still Stands

Editor THE AUTOMOBILE:—What is the fastest a man ever travelled in what, and where?

2—What is the fastest ever travelled on a motor cycle?

3—What is the fastest time made in a Packard Twin Six stock car, what body and number of passengers?

4—What is the fastest time made in a Packard Twin Six stripped chassis and stock car?

Charlottesville, Va. C. E. S.

—The fastest a man ever traveled, and lived to tell of it is 141.73 m.p.h. This record was made by Bob Burman in April, 1911, at Daytona Beach, Fla. The car used was the Blitzen Benz. The mile was traveled in 25.40 sec.

2—THE AUTOMOBILE keeps no record of motor cycle records.

3—The fastest time that the Packard Twin Six stock car ever made as far as official timing is concerned is 72.7 m.p.h. for 10 miles. This was with one passenger with top and windshield on the car. The top was down but the windshield was up.

4—The time made by the Packard Twin Six stripped chassis at the Sheepshead Speedway was 102.25 m.p.h.

Sign Your Inquiries

The Rostrum is in receipt of a number of inquiries which are either unsigned or signed by initials only. All letters to be answered by this department must bear the signature of the sender as an evidence of good faith, although *in publishing* only the initials are given.

The History of the American Automobile Industry—8

Completing the Narrative of Early Endeavors in the Steam Automobile Field —Public Grows More Accustomed to Self-Propelled Road Vehicles

By David Beecroft

AT that time, even bicycles were causing considerable trouble to horse drivers whose horses were as nervous as themselves and a number of farmers threatened the Smith company with suit if it did not keep the motor vehicle off the roads. Smith, therefore, had it stored in the loft over the pattern shop until people got ready for it, as it was probably 20 years ahead of the times. The Smith machine was afterward destroyed without further test, Mr. Smith having died before the patent was issued.

Whitney's Practical Ideas

In considering the activity of advocates of the steam automobile, the successful efforts of George E. Whitney were very largely the immediate forerunners of the work of the Stanley brothers, through whom the steam vehicle finally was introduced successfully to the public. During the years preceding 1898 Whitney operated several very successful steamers substantially like that of the Stanleys. These little vehicles, driven around New England, went far to accustom people to the steam vehicle idea and prepare them to receive it when placed on the market. While it is true that Whitney was indebted to Roper, Copeland and Bullard and probably others for the ideas embodied, it is also true that he put these ideas in the most thoroughly practical shape and demonstrated them so successfully that a casual observer could see little difference between his vehicles and the products that followed in the next few years.

All told, he built seven cars in 3 years. He gave preference to bicycle wheels and pneumatic tires, tubular steel frames and chain drive. His fifth vehicle had 30-in. front wheels and 34-in. rear wheels with 2-in. pneumatic tires. It had a boiler that was 14 in. by 20 in. and contained 340 ½-in. copper tubes. One of his vehicles ran from Boston to Hartford, a distance of 142 miles, in less than 8 hr. in Sept., 1897, an average of 17.7 m.p.h., and he exhibited two of these carriages at the Charles River Park, Boston, Mass., in the fall of 1898, where the steamer first successfully attracted the attention of the public.

Other Steam Vehicles

One of the interesting vehicles entered at the Chicago *Times-Herald* exhibition and contest in 1895 was a little attempt at steam propulsion by A. C. Ames of Chicago, Ill. This vehicle was nothing more or less than two ordinary bicycles, the cranks of which formed the crank-shaft of a steam engine. That the engine might be small the cylinder bore was 1¾-in., with a stroke of 13 inches. The boiler capacity looked inadequate but such a light vehicle did not require much power to propel it. Aside from being exhibited at this first American automobile event this Ames construction seems not to have had much influence on the industry. Like one of A. L. Riker's early electric experiments it carried a vehicle body on springs between the cycle frames, and its total weight was said to have been under 400 lb., which was extremely light considering that the body seated four people.

The Simonds Design

A fairly successful attempt at constructing a steam car was made in 1893 by C. L. Simonds, an engineer of Lynn, Mass. This vehicle carried two people mounted rather high, the frame being under cut so that the front wheels could turn on a continuous axle as in a horse vehicle. At the rear was mounted a vertical boiler and the control was a hand wheel at one side just back of the seat where the operator could reach it. It used wire wheels but was not of the later accepted design and probably saw no great amount of service.

A couple of years later Dr. F. L. Sweaney of Philadelphia, Pa., had a steam car built by the Charles S. Caffrey Co. of Camden, N. J.

Public Assumed Failure

There were many other sporadic attempts throughout the country during this period but for one reason or another they were not followed up. Not knowing the reason for their non-continuance the public very naturally assumed them to be failures, and this, as much as anything, was responsible for the slow growth of favorable opinion in the minds of the public concerning the motor vehicle.

In most cases these pioneers did not lose faith but later appeared more or less actively in the industry, Dr. Sweaney, for example, being afterward the owner of the first Winton car taken to Philadelphia.

450 at Detroit S. A. E. Banquet

Enthusiasm and Striking Co-operative Spirit Pervades Record Representative Gathering of Men Prominent in the Industry—Talks by Chas. Clifton, W. H. VanDervoort and I. F. Marcosson

DETROIT, MICH., Dec. 9.—As a fitting climax to its activities of the year, which have been the most successful in its history, the Detroit Section of the Society of Automobile Engineers held a monster banquet to 450 automobile manufacturers, engineers and other representatives of the motor car industry here to-night. It was a big affair, not only in point of number, the guests swelling to overflowing the banquet hall of the Ponchartrain Hotel, but also in the striking enthusiasm and co-operative spirit which pervaded the entire assembly.

A Notable Gathering

Many well-known automobile men were in attendance including officers of the national S. A. E. and other big men in the industry. President W. H. VanDervoort acted as toastmaster and at the speakers' table there were among others C. W. Nash, president General Motors Co.; H. M. Jewett, head of the Paige-Detroit Motor Car Co.; Howard Marmon, Nordyke & Marmon; Col. Charles Clifton, head of the N. A. C. C.; Coker Clarkson, general manager S. A. E.; John F. Dodge, Dodge Bros.; W. C. Anderson, Anderson Electric Car Co.; Arthur B. Cumner, S. A. E. Council; David Fergusson, Pierce-Arrow Motor Car Co.; W. E. Flanders, president Maxwell Motor Co., Inc.; Christian Girl, Perfection Spring Co.; Earl Holley, Holley Bros. Co.; E. W. Lewis, Timken-Detroit Axle Co.; Isaac F. Marcosson, business writer; Wm. E. Metzger; C. S. Mott, Weston-Mott Co.; Thomas Neal, General Motors Co.; C. A. Pfeffer, Chalmers Motor Co.; C. B. Rose, S. A. E. Council; J. G. Rumney, Detroit Steel Products Co.; W. R. Strickland, Peerless Motor Car Co.; R. H. Spear, Scripps-Booth Co.; John Utz, Perfection Spring Co.; S. D. Waldon, Cadillac Motor Car Co.; W. E. Scripps, Scripps-Booth Co.; Artemus Ward, Jr., King Motor Car Co.; Percy Owen, Saxon Motor Corp.; George W. Houk, Houk Mfg. Co.; J. W. DeCou, Jeffrey Co.; H. W. Alden, Timken-Detroit Axle Co.; Fred Haines, Regal Motor Car Co.; Harry Bassett, Weston-Mott Co.; George W. Dunham, consulting engineer; F. E. Moskovics, Nordyke & Marmon; Lee Anderson, Hupp Motor Car Co.; W. C. Rands, Rands Mfg. Co.

The above are some of the stars at the speakers' table, acting as a sort of bodyguard for Toastmaster VanDervoort. This is without doubt the most representative gathering of automobile men ever assembled in Detroit and their presence gives fitting proof of the rapid strides that the Society is making not only nationally but locally as well.

The speakers of the evening were in addition to the toastmaster, Col. Charles Clifton, whose topic was Engineering Co-operation; Nicolas Kouznetzoff, representative of the Russian government, who greeted the gathering in his native tongue; James Schermerhorn, publisher of the *Detroit Times;* Isaac F. Marcosson, whose subject was "The War and Business"; Arthur Nealey, the boy president of the Illinois Model Aeroplane Club of Chicago, who made some prophecies regarding the future aeroplane and entertained the staid business men with the flights of toy flying machines.

A Plea for Co-operation

President VanDervoort, before introducing the first speaker, took the occasion to plead for greater co-operation between the manufacturers and the engineers who design their cars. He said he could think of no better Christmas present to worthy employees than to give them a membership in the Society. He further asked that special attention be given to communications from the Society to the end that the interests of all might better be served.

In his opening address Mr. VanDervoort also brought greetings from the new Mid-West Section which was organized last week in Chicago. He expressed himself as being astounded at the vigor and vim shown by the Detroit Section and said that it was very gratifying to the Society as a whole. Push and co-operation must be the aim in order to make the automobile industry the greatest in the world.

Standardization and Progress

"You are all interested in the work of the Society of Automobile Engineers, either directly or indirectly," said Mr. VanDervoort, "and we are extremely anxious that this interest shall develop far beyond the passive point. When called upon for financial assistance, you have readily responded here in Detroit, and elsewhere. You have given us liberal appropriations, through the Automobile Chamber of Commerce, for carrying on the standardization work of this Society. But financial assistance is not all that the Society of Automobile Engineers wants. It requires your interest in its work, and your appreciation of the results. This Society has come to be a very necessary factor in the development of this greatest of American manufacturing industries, and we desire the unqualified sympathy and support

of those high up in the management of the affairs of these great manufacturing institutions.

"The present highly developed state of this industry is very largely due to the standardization work of the Society of Automobile Engineers. Through its efforts, duplication of effort is being eliminated, and the standardization of parts, materials and design has made possible great economies in the production of automobiles. I wonder if we fully realize the enormous financial savings we have received from this standardization work. I fear that the efforts in this direction are not as keenly appreciated at all times, as they should be.

"You ask how you can help in this work. It is simple. Join the Society as an associate member, if your engineering qualifications do not permit your coming in as a regular member. In so doing, remember that the Society is working directly for your benefit. We cannot expect you to devote any considerable amount of time talking about the merits of this Society."

Col. Charles Clifton briefly summarized the early performances and contests of automobiles as an introductory to his main topic. One generation ago the experimental automobile made its bow in America, he said, and 20 years ago Thanksgiving Day there was a so-called race in Chicago. To qualify, the machines had to cover a 33-mile course in 9 hr. None of them did it in 9 hr., but the prize was awarded anyway because it was bad, snowy weather. He contrasted that early performance with the ability of the automobile of to-day. The thousands of motor vehicles in use to-day are an example of the greatest co-operation the world has ever known. They are the result of co-operation of human instincts and Col. Clifton holds that this spirit of getting together for united effort must continue to grow as the industry grows. He paid special tribute to Detroit when he said that whenever anyone sees an automobile, he thinks Detroit. He pronounced this relationship the greatest any city ever had.

B. V. Constantinoff, interpreter for Nicolas Kouznetzoff, Russia's representative, spoke for his principal and greeted the American engineers on behalf of his people. "America now," he said, "is a heart of automobiledom, and he wants us to bring some business to Russia. "We need you there, and you think so little of us," he said.

Mr. Schermerhorn, after a series of rapid-fire moral lessons and as an entertaining mixture of humor, paid tribute to Henry Ford when he said: "In your hearts you should be thankful that your industry has produced the man to head the peace expedition which has set forth with an honest desire to bring about peace. Fanciful, unpractical, fanatical, and all, it may be, but despite the criticism, it is sincere."

Mr. Marcosson, in his authoritative talk on war and business, told the manufacturers that they must prepare for a gigantic trade war with Europe at the close of the present great conflict. He struck deep at the impairment of our goodwill with foreign countries, by sending them in their hour of need inferior merchandise for the sake of enormous profits. He warned the country to be prepared industrially.

Extracts from Mr. Marcosson's speech follow:

What the War Means to Us

"The war is the ill wind that blew us good. Before Europe saw red we were in a bad way, as you and I knew, to our cost. Our business had been legislated, 'investigated,' commissioned and regulated almost into extinction; capital was wary; panic hovered.

"Then this war crashed into commerce, paralyzing trade, stifling credit, choking up the channels of communication. Yet the world had to be fed and clothed and armed. We alone stood at the universal trade counter ready to do business, and we did it. A frenzied prosperity fell into our laps. The era of the war order began.

"But the plain truth of the matter is, that while we have capitalized a great prosperity out of the war, we, as a commercial people, have been very short-sighted. We have only seen the profit of to-day and lost sight of the permanent gain of to-morrow. We have been speculators where we should have been investors; we regarded a vast world trade opportunity as an expediency rather than an asset. We have sold goods instead of good-will.

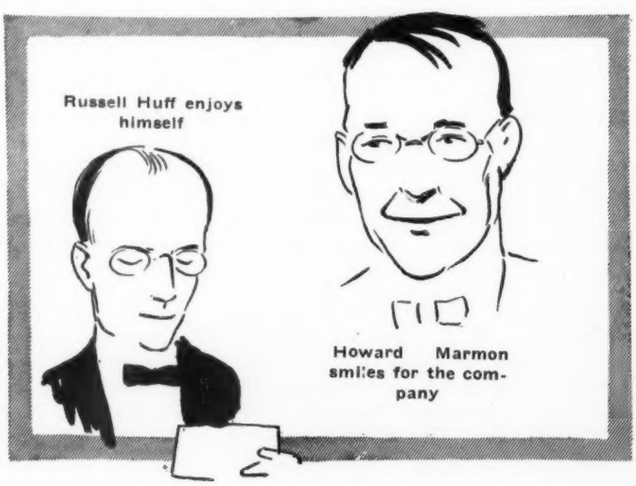
Automobile Quality High

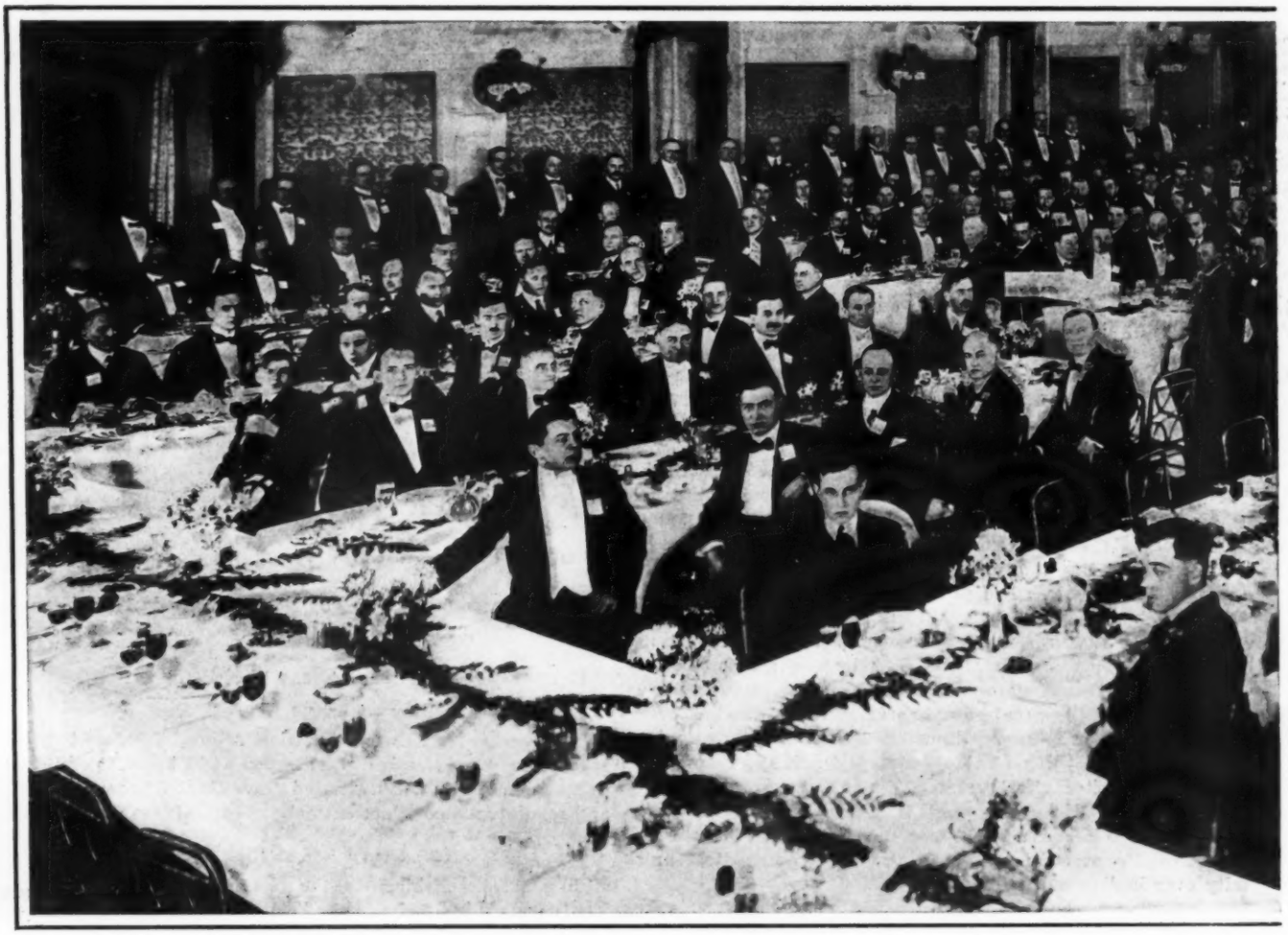
"And let me say right here that in all the stream of exports that has rolled up a foreign trade of over five billions of dollars in twelve months the one product that has maintained the standard of its integrity, whether for mission of mercy or destruction, in fair weather and foul, is the American automobile. It has been 100 per cent efficient every time, and you may well be proud of the record you have made.

"But this European business is only one phase of our commercial short-sightedness in such a crisis. Take South America. Here is a region bound to us by sentimental and geographical ties that could have been the easiest of commercial fields if we had taken the trouble really to study and prepare for its exploitation. England, France and Germany did it. When Germany wanted to invade that region she first sent men who studied the language; learned the customs and needs of the people. When she shipped goods it was goods that the countries wanted and kept on wanting. *We* were content to send a sporadic salesman with samples.

Germany's Forethought

"The war cut off South America from the source of supplies





Banquet given by the Detroit section of the Society of Automobile Engineers to 450 manufacturers, engineers and other

and money. We were too busy capitalizing a temporary opportunity to develop what was a permanent asset. Here is an example: One of the South American countries got rid of a president, and because of the decrease in import duties, due to the war, needed a loan. Vainly she tried New York. Do you know who produced the money? A German commission house in her capital city. The nation behind this house was at war, a war that menaced its life. Yet she was wise and far-sighted enough to buy some good-will with that loan. It will return a thousandfold after the war.

"These, and many other instances that I could give, show clearly that we have not definitely and deeply regarded this war as a permanent opportunity; it means that if we do not readjust our whole policy we will find ourselves isolated and alone when a merciful peace sheathes the sword and the world becomes normal again.

"If there is one message above all others that I would bring home to you it is this: Let us not deceive ourselves about this present war-time prosperity. What seems the easiest of selling now is but the prelude to the bitterest trade war that the world has ever known.

"No man can visit England now without feeling that in more ways than one we have lost prestige irretrievably. This loss of respect will inevitably be followed by loss of trade.

"She buys our goods now because she must. But this toleration of necessity will be followed by indifference, even trade hostility when peace comes, in a bitter trade reprisal.

England's Trade Reprisal

"And England will be equipped to make this reprisal as never before. Every turn of the industrial wheel in that galvanized and speeded-up Britain is full of significance for all of us. I have stood in her shell factories watching the forest of American-made automatics whirl and hum as they turned and beveled the cases that were soon to scatter death and terror on a hundred hard-fought fields. Half the population of the Kingdom is at work on this job; practically every lathe is on war work. And new factories are literally springing up over night.

"This huge and well-oiled machine, that works 24 hr. out of every 24, has a meaning for us far beyond its steady flow of munitions. In this perfectly organized industry, geared to highest efficiency, is the instrument for Britain's industrial regeneration after the war. Quantity production of ordnance now will mean quantity production of a hundred things, from small motor cars to safety razors, as soon as peace comes.

"Backing this is a national spirit of revolt against imports. 'What can we do without?' is the slogan that is now hitched up to the cry of 'Down with imports!' The war is teaching England what it has already taught Germany—the supreme lesson of self supply—and we will find it out to our cost in a diminished export on the one hand and a fierce trade war on the other.

The Cheap Labor Problem

"So, too, with France. One incident will illustrate. There is in the United States to-day a French Industrial and Commercial Commission, sent to buy machinery for the replenishment of the devastated factories of the North Country. Now it will be a good piece of business for us to sell $1,000,000,000 worth of machinery to these people.

representatives of the industry at the Pontchartrain Hotel on Thursday, Dec. 9, as a climax to the activities of the year

"But what else will it mean? These machines, and others that we will ship for some time to come, are for factories that in the main have employed hand labor—labor that only costs from 50 to 80 cents a day. What will happen when the war is over and the host of fighting men return to peaceful pursuits? Labor will not be dear; it will be cheaper.

"And what will happen? This cheap labor will be engaged in quantity production for articles that will meet ours in the great open market of world trade. The 50-cent worker on an American automatic in France will compete with the $3 to $5 a day worker in our own land. You don't need a diagram to tell you what product will be the cheapest, and what product the colonies will use when backed up by an efficient system of foreign trade development.

"No matter how the war ends, Germany will be an immense factor in this readjustment of world business. Mistress of efficiency in peace and war, she will not be long in striking her stride. Already she is buying the munitions for this new offensive of peace, and they are being bought in this country; agricultural machinery, vast quantities of raw material, all to be rushed to the home country as soon as the seas are free.

"Nor will quantity production and all its by-products be our only menace after the war. The hatreds that are now being fought out amid screaming shot and devastating shell on the battlefield will continue long after the smoke clears away. The nations that have fought together will trade together. Even those who are now fighting each other will find a community of trade interest because politics must inevitably enter into the new commercial alliances.

"Unless I am much mistaken, the United States, because of the rich harvest that it has reaped out of the war; because of the accepted belief abroad that our neutrality is a failure; because of our economic short-sightedness, will find itself almost isolated. Are we to become a commercial Ishmael with the economic hand of the world raised against us? It is a plain, blunt question, but it is well worth asking.

"But there is a remedy, my friends, a remedy that lies in a preparedness as important in its far-reaching effect on the great mass of the American people as is the defense of our hearth and home.

United States Must Standardize

"We need an adequate merchant marine; we must conclude new commercial treaties before the war ends in which we capitalize the supremacy that the world's need of us creates; we need a more complete system of international finance in which dollar credit goes hand in hand with the dollar product; we need some of the spirit of sacrifice that is animating the countries at war, for out of its fiery ordeal there will come a new and more efficient Europe. We need a business statesmanship that will put business advance above petty politics and will offer no barrier to legitimate enterprise."

Toy Aeroplanes Demonstrated

It is doubtful if the demonstrations of indoor flying of model aeroplanes was ever better carried out than by Arthur Nealey, who has made a study of the construction and operation of the model flyers. These tiny aeroplanes, which were made by Mr. Nealey, flew the length of the banquet hall, and some of them looped, while a model hydroplane was made to rise and fly from a basin of water with a run of only 10 in.

Reclaimed Scrap vs. Cheap New Rubber

PRICES for scrap tires have fallen to one-half of those ruling two years ago. In this fact there is indicated certain new and interesting relations between the rubber reclaiming industry and the tire industry. The principal reason for the lower value of the scrap seems to be that the reclaimed rubber is no longer used as an ingredient in new tires to any considerable extent and that the new uses which have been developed do not justify the old prices for the raw material. Much is now used for flooring materials, it is said, and for insulating compounds. The place formerly taken in new tires by reclaimed rubber is now taken more and more by inferior new plantation rubber and the low grades known as jelutong and almadeina, the prices for which are constantly going down and which, after all, are much more plastic and valuable for tire purposes.

Scrap Supply Reduced by War

While this is the general situation, there is at the present experienced a hardening in the prices paid for scrap tires, but this upward tendency seems to be only transitory and mainly due to the special conditions caused by the war. America is the foremost rubber-reclaiming country. Only during the last decade have reclaiming plants founded on American practice been established in England, where there are now four of large size, and Germany is farther behind, having bought increasingly large quantities of reclaimed rubber every year from both England and America until the war broke out. The prize of 100,000 marks offered by Germany for a really satisfactory reclaiming process testifies to her desire for an independent production in this line as well as to small faith in the widely announced methods for synthetic manufacture of rubber substitutes. The American mills, which formerly worked mainly with discarded rubber shoes and still make full use of this supply, now gather scrap tires not only from domestic sources but also from Europe. For the fiscal year ending June, 1914, about 20 million pounds of tire scrap were imported from European countries, according to the figures of the Department of Commerce of the United States, but for the year ending June, 1915, the imports were reduced to 4,286,195 lb., showing the effect of the war and perhaps also the effect of the lower prices paid. The incentive and the facilities for gathering the thousands of tires which are used up in the warfare are lacking, causing a temporary shortness in the supply, but on the other hand it is naturally to be expected that the close of the war will see the market glutted with the enormous quantities of tire scrap which must be piling up in different places near the war zones of the continent.

In considering the question whether the reclaiming industry is doomed to eventual collapse, *The Engineer* (London) arrives from these and other facts at the conclusion that reclaiming will remain an important branch of the rubber industry at least until new rubber is freely offered at 25 cents per pound, and in this connection it presents in its issue of Nov. 5 an account of the purposes and methods in the reclaiming of tire scrap which will be found of general interest.

The Commercial Object

Generally, the object in reclaiming vulcanized rubber scrap is to convert it, in so far as possible, into its original unvulcanized condition, so that it may be cast or formed in molds and revulcanized. But vulcanized rubber is insoluble in all solvents, whether it consists merely of rubber and sulphur or is heavily compounded with mineral matter, such as chalk, barytes, litharge, zinc oxide, etc. It may also contain organic additions such as oil substitutes, mineral oil, vaseline and pitch. Cotton fabric and wire are prominent components which must be removed.

In practice the aim of the large reclaiming works is simply to produce a substance for which there is a steady demand, rather than to attempt competition with the rubber planters in India and Africa, who now in many cases have got their local production cost down to 20 cents per pound for new rubber and eventually will be able to offer it in the markets of the world at a very modest figure. Even if it were found practicable to perfect the reclaiming methods technically to the point of producing from the scrap an equivalent for new rubber, it is evidently more than doubtful if all the impurities of the scrap may be removed so economically as to make such a refined output compete with the natural product. When nevertheless reclaiming works are not dismantled but, on the contrary, new ones are constantly erected, it is plain that the aim is no longer to arrive at a relatively pure rubber material of value as an ingredient in new automobile tires but to produce a plastic substance commanding its price for other less exacting purposes; and this observation explains also the stadily declining prices paid for scrap tires in conjunction with the continued demand for them and the slight increase in present quotations.

Chemical and Mechanical Methods in Reclaiming

In spite of numerous patents, only two methods for reclaiming rubber scrap have achieved any real success, one the acid and the other the alkali process. The acid process is the older and is still the more extensively used one, especially in the United States. By this process the scrap is first ground between steel rollers and thoroughly washed to remove dirt and metallic fragments. It is then treated with dilute sulphuric acid in tanks heated by steam, until all the canvas is destroyed. The rubber is then removed and washed separately to free it from acid, and the next process consists in heating it in live steam at about 300 deg. Fahr., either alone or mixed with mineral oil, after which it becomes softened sufficiently to remain plastic after a thorough drying, so that it can be sheeted on rollers.

By the alkali processes, some of which are controlled by patents, the canvas of the tire scrap is destroyed by a caustic soda solution at high pressure, and the softening of the rubber goes on at the same time, dispensing with subsequent heating. The method has the advantage that the caustic soda removes all oil substitutes as well as all free sulphur and the rubber resins.

By both methods, all operations are automatic after the first grading of the material. A more definite idea of the work can be gained by following its actual sequence at one of the modern mills, as follows:

Sequence of Operations

The scrap, after grading, is broken up, small enough to pass a ¾-in. screen, between fluted horizontal steel rollers which are about 4 ft. long and revolve inwardly at varied speeds. The next step is to remove metal fragments, and for this work a magnetic separator is used, whereafter the rubber is ready for the digesters or de-vulcanizers. These are steel-jacketed pans of cylindrical form and varied capacity. After the rubber and the caustic soda solution have been put into them, the manholes are tightly fastened and high-pressure steam is turned into the jackets. This process lasts several hours at between 300 and 400 deg. Fahr., until all canvas is destroyed, whereafter the contents of each digester, whose capacity is rarely less than two tons of rub-

ber, passes to special washing machines which remove the dissolved canvas, dirt and oily matter. The rubber, swelled with water, now passes to a mechanical water separator or draining machine where the bulk of this water is removed and and thence to vacuum driers which remove the rest of the moisture. From these driers the rubber comes in the form of crumb, and this is worked for some time on mixing mills, finally forming into homogeneous sheets. Two sets of mills are employed, one the same as used for fresh rubber and the other made with shorter rollers of larger diameter and working under higher pressure, so as to make sure of breaking up any granulated formation still occurring in the mass.

"The Car That Stays Young"

An Incipient Department for Data on Durability

APPARENTLY the popular trend of thought on durability runs irresistibly toward those features in the construction of a car which have always been most talked about; namely, the machinery parts. And these are precisely the parts with regard to which it may be said that all data on durability are smothered or complicated by a multitude of theory and operative considerations, but nowise neglected in practice. The two accompanying letters on the subject are both in this vein. In one of them the expenditure of $2,000 to provide a new dress for a 1909 chassis is mentioned as a means successfully employed for making the car continue to appear "young." But the intended object of this column is not to glory in the chassis which outlasts its body work, but rather to collect facts which will show how the stationary parts of the car may be made to give satisfactory service as long as the machinery parts on which nearly all competent attention has been concentrated in the past; in other words, in the case just referred to, how the the expenditure of $2,000 may be avoided, reduced or delayed without loss of style or service. By degrees this phase of the subject, though knowledge of it is composed of many odds and ends not so far collected in one place, may perhaps come into its rights. Meanwhile the views on durability which are actually entertained in the industry and among the public are not without interest.

Editor THE AUTOMOBILE:—The following outline of facts relating to Hyatt bearings may interest readers of your columns on "The Car That Stays Young."

In every motor car there are some parts which are constantly subject to wear. Eventually they must be replaced. In the building of such parts, the engineer's aim is to produce such high quality as to guarantee long life, with a minimum expense for replacement when that replacement finally becomes necessary.

The Hyatt flexible roller bearing, due both to its principle and its construction, offers an example of how such a difficult problem may be solved.

Loads carried on Hyatt bearings are distributed over the entire length of the bearing roller which has the ability to flex very slightly. Under certain conditions, therefore, it is possible to operate a Hyatt roller bearing directly on a surface which is considerably less hard than is ordinarily required for bearings made of solid rollers or balls.

Naturally, the proper attention must be given to the relation between the bearing sizes, the loads imposed, and the hardness of the surfaces involved. For the most severe applications, the inner and outer races provided with the bearings of the Hyatt flexible roller type are hardened to a point comparative with ball bearing usage. For other places, where the bearing proportion and lighter loading make it possible, an outer race is furnished which is not quite so hard as the races previously mentioned, and is less expensive to manufacture. These races, for their particular duty, are entirely practical and satisfactory in operation and at the same time they may be replaced at lower cost when they have suffered the wear which is bound to occur, because of the greater hardness of the rollers.

There is a temptation at times for the car manufacturer to omit entirely both inner and outer races, and to operate the rollers directly upon adjacent units. For example, the bearing rollers might be operated directly upon the tubing in an axle housing. If this tubing could be made so tough and hard that there would be no wear, of course something would be gained in bearing cost. Such a construction, however, appears to be almost impractical, whether it is contemplated to use the tubing as an outer race or, in connection with floating wheel hub bearings, as an inner race.

It has been found quite practical to heat-treat solid shafting of alloy steel so that it may be satisfactorily used as a bearing race. This construction is widely used in connection with Hyatt bearings, particularly in transmissions or gearboxes.

The engineering department of the Hyatt company approves such applications only when the ultimate cost to the consumer is given as much consideration as the first cost to the manufacturer.

A certain manufacturer at one time operated the bearing rollers directly against the tubing in the axle housing, in connection with a semi-floating wheel hub application. Recently he was convinced, after some argument, that the sensible way to keep his car "young" at this particular point was *not* to omit the outer race of the Hyatt bearing for the sake of the small first cost.

Usually we find that the slight saving in first cost by omitting the hardened and ground inner and outer bearing races is more than offset by the loss of ability to withstand wear. Very fortunately, however, more and more motor car manufacturers are seeing this in the right light.

Detroit, Nov. 29, 1915. CLIFF KNOBLE.

In the following letter our easy distinction between "young" and "new" is thought needful of explanation.

Editor THE AUTOMOBILE:—As to "the car that stays young," I think that it must be conceded that there is a good deal about it that is psychologic in character. Are all of the cars OLD which we speak of, and think of, as being old? Just as it is with the garments which we wear; to look right we must don modern clothes, and to keep a car young we must be able to furnish it with a new suit for appearance sake. In 1913 it cost Bill Grandin about $2,000 to get a new party dress for the old 1909 (* *) chassis. But it was worth it. That chassis was not old, although it had been driven 60,000 miles over rough country. With the new dress, and paint, and the streamlines, and the chassis rebushed, that car is to-day quite young, and will be young when the debutantes of to-day have succumbed to *locomotor ataxia* or *paralysis agitans*.

I have a little, modest, 15-30 (* * *) car which is now six summers, five winters, and 30,000 miles old. She wears the original suit of clothes dyed over. Her back hair is different and the skirt and sleeves are criticized by the fashion editor, and she does not go to parties because she has no evening dress suit, but she is not old. Her heart, lungs, digestive system, are perfect and she can show most of them how to run and jump, and she comes in laughing, eats and sleeps well, and gets up in the morning with a clear brain.

Back in 1912 it almost seemed that it might be nice to exchange this same little lady for a fresh flame selling at $1,800, or so. but she was kept in the harness and properly groomed. When 1913 came the fresh-looking flame of the year before could not be considered as a match for the little girl, now in the senior class.

About a month ago I spent a week in Boston and saw the crowds of automobiles. It seemed to me that all of the output of the one special factory must have gone into Boston. They ranged from the newest creations back, at least as far as 1909. But how sweetly they all ran! No matter how old, or how it was dressed, it showed class. Those cars stayed young. You don't need to tell me that the present day cars are made of better stuff! I don't believe it.

I saw a rear axle in one of the modern creations go up a few days ago. The stuff that was in that assembly was a crime. And they would have wanted $1,000 to trade that beast for my Molly.

I am glad that Mr. Osborne draws attention to the question of lubrication. The designers have given it but little attention, and the users think of it still less. There has been a

(*Continued on page* 1109)

Leakage Past Rings 9 Per Cent Water

Collects in Crankcase and Must Be Carefully Watched in Multi-Cylinder Motors

By Victor C. Parker

A GREAT many motorists have been surprised when draining the oil from their motors, to find a pint, or even a quart of water emerge with the oil. Others have never noticed its presence in their motors until it made itself apparent in a lack of lubrication or, in winter, by means of a frozen oil pump. This phenomenon has been the cause of much worry and not a little real trouble to owners and service men alike, and with the advent of the eight- and twelve-cylinder motors, bids fair to become a full-fledged bogey of equal rank with missing cylinders and slipping clutches.

How does the water get there? Where does it come from? You start out with a brand new car, we will say, taking care to strain the gasoline through a chamois and examining the cylinder oil closely for any suspicion of water. You drive a few hundred miles and then remove a drain plug from your crankcase to get rid of sediment and—Presto! you have caught a pint or more of perfectly good water. There is the mystery!

A number of explanations of how and why the water gets into the crankcase have been advanced, and different drivers have observed all the precautions possible. Gasoline has been strained, lubricating oil analyzed, cylinders examined for cracks and leaks, the position of the carbureter intake investigated for the possibility of collecting rain or spray coming through the radiator, and even the garage attendant with his hose and sponge has been looked on with suspicion, but the next time the crankcase was drained, the water would be there as usual.

The explanation, of course, is very simple, once the process of combustion is thoroughly understood, because water is one of the products of combustion in the gas engine cylinder, and its presence is to be expected in every motor, though there are several reasons why certain motors will collect more of it than others.

Combustion Is Oxidation

In the first place, it must be understood that the "explosion" which occurs once every other revolution in each cylinder of a four-cycle engine, is nothing more or less than a rapid combustion of the gasoline vapor provided by the carbureter. From a chemical standpoint, combustion is merely an oxidizing process, by means of which the constituents of the gasoline are combined with the oxygen of the air to form new compounds and liberate a large amount of heat.

Gasoline is a mixture of a number of compounds of hydrogen and carbon, all of which have the general formula $CNH_2N + 2$. When burned with the proper amount of air, the hydrogen and carbon combine with the oxygen to form water (H_2O) and carbon dioxide (CO_2). Hence, water is always one of the products of combustion, and at the temperature of the explosion, exists in the cylinder in the form of superheated steam at high pressure.

Now, no matter how perfectly the piston rings fit the cylinders, or how tight their joints, there is always bound to be some slight leakage of the products of combustion past the rings and into the crankcase of the motor. As the superheated steam enters the crankcase it expands rapidly and cools down until it condenses into fine globules of water on the crankcase walls and eventually finds its way to the lowest point. The carbon dioxide, however, is a fixed gas, and simply passes out through the breather tubes unnoticed, but the water continues to collect as long as the motor runs.

The presence of water vapor in the exhaust gases may also be noticed in the white steam formed at the muffler tail pipe on a cold day, or in the constant drippings from the jackets of carbureters that are exhaust heated.

From the above it may easily be deduced that leaking or ill-fitting piston rings and scored cylinders will allow more gas to blow by, and consequently more water will condense in such motors. It is also true that new motors, in which the rings have not yet had time to become thoroughly lapped to the surface of the cylinder walls, will condense more water than those which have been well run in. It is equally evident that the more ring surface exposed to the pressure of the hot gases, the more chances there will be for slight leaks. This explains why water in the crankcase is more prevalent with six-cylinder motors than with four, and no doubt this trouble will be more apparent in the new eights and twelves than in the sixes, because with the bore-stroke ratio kept constant, doubling the number of cylinders for a motor of a given displacement increases the ring surface, and consequently the chance for leakage, by over 50 per cent.

Carbureter Adjustment Important

But the number of cylinders and the fit of the rings are not the only factors to deal with in considering the amount of water likely to condense in the crankcase. Strange as it may seem, the carbureter adjustment has fully as much or more effect on the quantity of water collected. In fact, it is to the adjustment of the carbureter that we must look for the only available remedy in existing motors. Too rich a mixture means an excessive amount of water in the crankcase just as surely as it means the formation of carbon in the cylinders, a smoky exhaust, and fouled spark plugs, and once this point is properly appreciated by engineers and service men, the presence of excessive amounts of water can be largely avoided, though it cannot be entirely eliminated.

Returning to the chemical theory of combustion, let us first consider the case of a motor running on a perfect mixture. For practical purposes we can use the formula for hexane (C_6H_{14}) as representing the proportions of hydrogen and carbon in ordinary 70 per cent gasoline. We will adjust our carbureter to burn, say 1 lb. of gasoline and give perfect combustion in all cylinders.

The atomic weight of hydrogen is 1, and that of carbon 12. One lb. of gasoline (C_6H_{14}) will therefore consist of 0.163 lb. of hydrogen and 0.837 lb. of carbon. The products of combustion of a perfect mixture, as we have seen, are water (H_2O) and carbon dioxide (CO_2), the oxygen for these compounds being obtained from the air. The other constituent of the air, nitrogen, is generally considered inert and does not take any part, chemically, in the combustion.

To convert our 0.163 lb. of hydrogen into water (H_2O) will require 1.304 lb. of oxygen (atomic weight 16), and to convert the 0.837 lb. of carbon into carbon dioxide (CO_2) will require 2.231 lb. of oxygen, making a total of 3.535 lb. of oxygen required for combustion. But since oxygen consti-

tutes only 23 per cent of the atmosphere and nitrogen 77 per cent, we will have to take 11.835 lb. of nitrogen into our cylinders along with the oxygen, which means that we will use 15.370 lb. of air with our lb. of gasoline, the resulting products of combustion being 1.467 lb. of water (H_2O), 3.068 lb. of carbon dioxide (CO_2) and 11.835 lb. of inert nitrogen. The water therefore forms 8.96 per cent of the products of combustion and this proportion of any leakage past the rings will condense in the crankcase.

Lean and Rich Mixtures

It will be observed that in our perfect combustion we used 1 lb. of gasoline to 15.370 lb. of air, but it is a well known fact that mixtures as rich as 1 to 7 or as lean as 1 to 32 will burn. Now suppose that instead of the perfect mixture we have been using we run our motor on a very rich mixture, say about 1 to 10. What are the results?

In the first place, the size of the carbureter, throttle opening, and speed of the motor will determine the amount of air taken in during a given length of time, and as we should endeavor to keep those conditions as nearly constant as possible, we will enrich our mixture by adding more gasoline to the 15.370 lb. of air used in the first case. As a result, it will be discovered that we have not enough air for complete combustion, and therefore will not obtain the same products as the result of the combustion.

Hydrogen, having a greater chemical affinity for oxygen than carbon, will take out enough oxygen to form water, regardless of the remaining reactions, and as we now have 0.245 lb. of hydrogen it will require 1.960 lb. of oxygen for its combustion, forming 2.205 lb. of water. This leaves only 1.575 lb. of oxygen remaining from the 3.535 lb. contained in our original 15.370 lb. of air, or an amount insufficient for the complete combustion of the carbon, which under these conditions will form the unstable compound carbon monoxide (CO). Combining the available 1.575 lb. of oxygen with carbon to form carbon monoxide (CO) requires 1.181 lb. of carbon, resulting in 2.756 lb. of carbon monoxide (CO) and leaving 0.075 lb. of free carbon, which will either collect on the cylinder walls and piston head or be blown out of the exhaust in the form of a dense black smoke.

In this second combustion we have used 1.5 lb. of gasoline to 15.370 lb. of air, the resulting products being 2.205 lb. of water (H_2O), 2.756 lb. of carbon monoxide (CO), 0.075 lb. of free carbon (C) and 11.835 lb. of inert nitrogen. The water now forms 13.06 per cent of the total, and will be apparent in that proportion in the leakage to the crankcase.

In other words, we have increased the amount of gasoline in our mixture by 50 per cent and the amount of water in the crankcase by nearly 70 per cent.

Incidentally, the rich mixture has further handicapped our motor by leaving a generous deposit of free carbon in the cylinders to cause knocks and overheating, and materially cut down the amount of power by an incomplete combustion.

From the above, it will be seen that water is one of the natural products of combustion in the gasoline motor, and that its presence in the crankcase under certain conditions cannot be entirely eliminated, but that properly fitted piston rings and a proper carbureter adjustment will reduce it to the minimum. In the eight- and twelve-cylinder motors with their largely increased ring surface in proportion to their piston displacement, engineers may yet find it necessary to provide some means for trapping and removing the water before it can collect in the lubricating system.

"The Car That Stays Young"

(*Continued from page* 1107)

lot of talk of keeping the springs lubricated, but *they* do not wear out; but what of the shackle-bolts? Why doesn't some kind person get up some easy and efficient way of taking care of them? Even in cheap cars it seems to me that the spring-eyes could be fitted with bronze bushings and hard shackle-bolts used, so that the replacement of the bushings would be all that would ever be necessary.

The best sort of lubricant for the different parts is not taught as it should be. Mr. C. W. Stratford is the first to give it attention for the public [in S. A. E. paper]. Graphite is not used as much as it should be. I drove an old * * * * 30,000 miles without adjusting the main bearings of the motor, because I used Oildag in my motor oil. Ninety per cent of the people never wash out the crankcase.

Proper care, and even great care, is the price we must pay for the "car that stays young."

W. M. ROBERTSON, M.D., B.Sc.

Warren, Pa., Dec. 10, 1915.

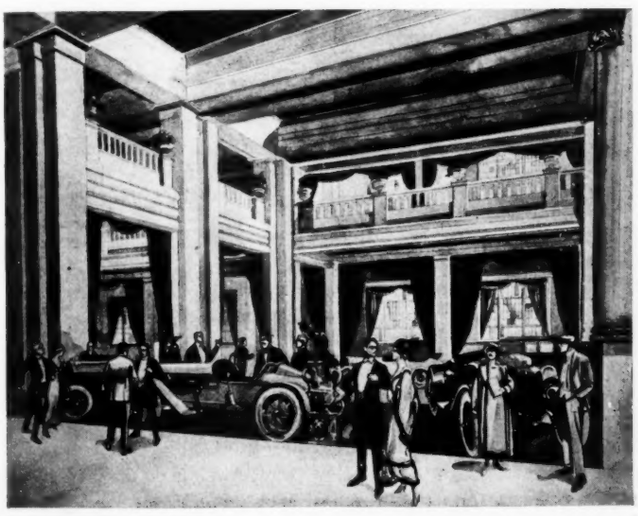
In this letter the names of the cars to which Dr. Robertson refers have been omitted. But if real test data on materials or design details had been offered care would have been taken to identify them completely.—M. C. K.

The Palace of Motoria

THE accompanying illustration gives an idea of the plan of decoration to be used in transforming the Grand Central Palace into the Palace of Motoria for the New York show which is to open at 2 p. m., Dec. 31. Motoria is the goddess who watches over the destinies of the automobile industry and, visualized in statuary, has been a part of the decoration at a number of automobile shows of the past. The goddess stands with hands outstretched upon a steering wheel with her draperies blowing in the breeze.

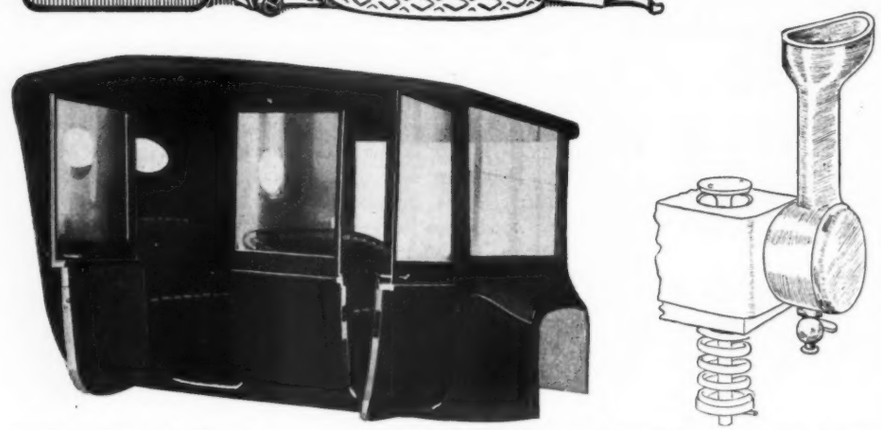
The Palace will be decorated with 25,000 yd. of maroon velvet festooned in blue and gold, and on the main floor the columns which form the central court are to be treated with blue hangings draped from the bays between the tops of the columns and gathered near the base. The hangings will be edged in gold braid and fringed.

The upper cornice surmounting the columns forming the railing of the second floor will be decorated with a mass of flowers, while the columns on this floor will be treated in Renaissance figures and pergola effects.



Illustrating the decoration scheme for the central court at Grand Central Palace for the New York automobile show

ACCESSORIES



Left—American top for Fords. Right—Heiser valve tester

American Top for Fords

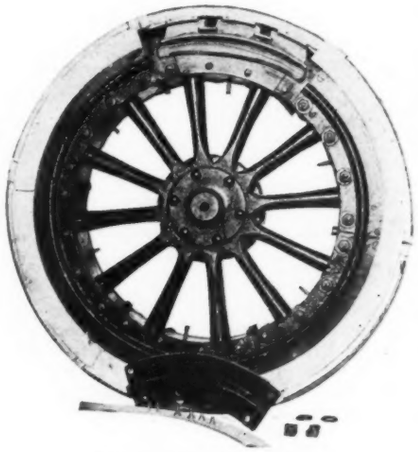
A NEW design convertible top for Fords has been added to the line of the American Top Co., which has three salient features, according to the maker. It is weather-proof and embodies the advantages of the convertible detachable top but weighs much less; it includes a standard one-man type of touring top with Jiffy curtains; and it includes a rain-vision ventilating windshield with cowl, making it adaptable to all Ford models.

It may be installed in about 2 hr. and permanently takes the place of an ordinary top, the mounting of the glass sides for winter use requiring only about 30 min. These glass sides are set in enameled steel frames with heavy tape insertions between glass and frame on both sides, making a noiseless, firm setting. The glass is fastened to the doors by a one-piece steel flange that connects directly with the door and may be quickly screwed into position. With the door glass is included a door lock by means of which the regular Ford lock can be opened from the outside. Doors are all equipped with anti-rattle rubber inserts and fit tightly. The glass partition between the two doors fits firmly to the top rail and at the bottom by a metal flange, and is again attached firmly to the top, the contact being made between two heavy cloth folds so that there is no friction or chance for squeak or rattle. Top material is long-grain English effect artificial leather.

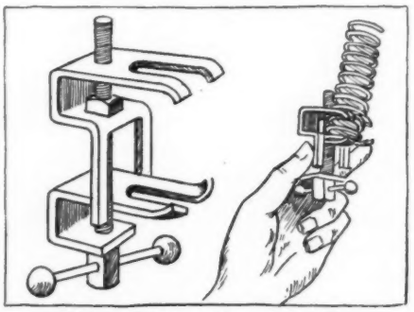
Including windshield, cowl, glass sides and one-man type top with Jiffy curtains, the price is $55. Daly & Co., Detroit, Mich., have exclusive sales rights. —American Top Co., Jackson, Mich.

Heiser Valve Tester

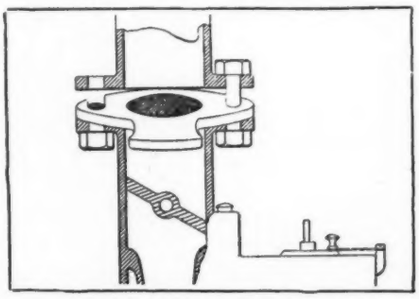
This device is a little reservoir with a funnel at the top and a drain cock at the bottom and in the body an opening which is clamped against the valve port, after the manifolds have been removed, by the same means that are used to clamp the manifolds in place. Gasoline or water is poured into the tester when the valve under test is seated, and leakage past either valve or stem indicates the need of attention. The device can be applied to any valve port not more than 2 in. in diameter. Price, $2.—Heiser Special Tool Co., Kingston, Mo.



Cannes pneumatic wheel



Eagan valve spring compressor



Joswich intake manifold screen

Cannes Pneumatic Wheel

This is a new type of pneumatic wheel which has recently been patented. The wheel has its pneumatic part embodied in the wheel itself and forms an inseparable part of it. The resiliency is obtained, as in the present tires, by inner tubes inclosed in metallic casings. Instead of one casing per wheel, there are six segmental ones absolutely independent of each other and each containing its own inner tube. The segmental casing is formed by metallic side plates bolted to the rim and a metallic shoe sliding between these plates. The shoe is covered with solid rubber at the outside and is prevented from leaving the casing by the plates' flanges. The segmental feature of the tire has the advantage of keeping the radius of the wheel always constant and therefore the centrifugal force is also constant. It is claimed there is no increase of stresses in the rim, neither is there required any additional effort of the engine to overcome the increase of the centrifugal force.

The wheel-tire is puncture-proof and should an inner tube wear out its replacement by a new one is simple and can be made without having to jack up the car.—E. Cannes, New York City.

Joswich Vaporizing Screen

This is a gasket designed for insertion between the manifold and the carbureter, containing a wire gauze screen for breaking up solid particles of gasoline from the carbureter. The gasket has slots instead of bolt holes, so that to insert it the bolts are loosened, not removed, and the device slipped in. To remove it for cleaning the process is reversed. The screen is said to prevent the passage of flame down the pipe when the motor backfires. Price $3.—F. Joswich Mfg. Co., St. Paul, Minn.

Ieco Steer Warm for Winter

For winter driving the Ieco Steer Warm grips are intended to displace cumbersome gloves which tend to lessen the firmness of control of the steering wheel. The operation is electrical, depending upon a resistance coil which consumes but a small amount of current to furnish the necessary warmth to the hands. The device consists of two leather-covered grips, one for each hand which

can be laced upon the steering wheels at any points convenient for driving. The resistance wires are arranged between two copper plates in such a way that the heat is readily led to the hand. After a certain heat is attained the Steer Warms become no hotter but maintain an even temperature. For Ford cars there is a specially-designed pair which are so made that the electric headlights can be used at the same time as the heater.

One of the advantages claimed for the Steer Warms, besides the comfort obtained, is the fact that with only a light pair of gauntlets, one is enabled to grip the wheel tightly on the coldest day, thus giving good control of the car on icy surfaces. The price for Ford cars is $5 and for other makes $7.50.—Interstate Electric Co., New Orleans, La.

Eagan Valve Spring Compressor

The Eagan valve spring compressor is designed for Fords or other small cars. It is made of sheet steel, hardened, and has forked arms, one of which is placed under the spring cup and the other as high as it will go in the convolutions of the spring. By operating the screw handle at the bottom the spring is easily compressed until the pin and cup can be removed. Price, 60 cents.—Fred. Gabriel Auto Supply Co., Brooklyn, N. Y.

A. B. Neutral Lever Lock

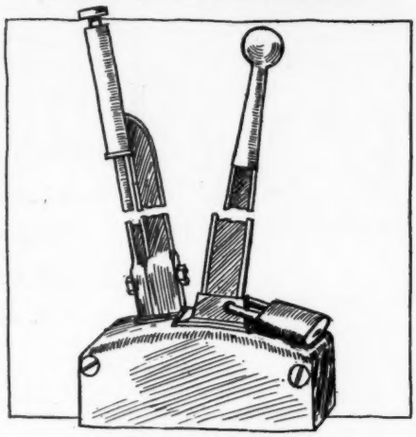
A plate with an upstanding flange which fits around the gear lever like a collar has in it two holes. A hole is drilled in the shank of the lever in line with the two holes in the collar, and all three holes are in line when the lever is in neutral. A Yale padlock, supplied with the device, is slipped through the three holes, holding the lever in neutral. This arrangement permits the car to be moved by pushing, which is not only convenient but is necessary in an emergency when there is no time to unlock the lock or when there is no key at hand. Price, $1.50.—A. & B. Specialty Co., Milwaukee, Wis.

Peerless Battery Box Black

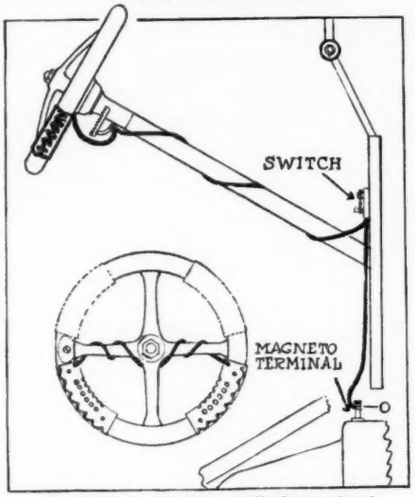
This is a solid-covering black enamel-like paint which resists the action of acid and is especially useful for battery boxes, cases and any part where the acid is likely to come in contact with the wood or metal. It saves having the wood cases replaced and the metal battery boxes from being eaten away. The maker states that this product has been tested out for over a year and that one test board coated with it was submerged for three weeks in strong acid without any effect on the finish.—Columbus Varnish Co., Columbus, Ohio.

Lyon Adjustable Bumper

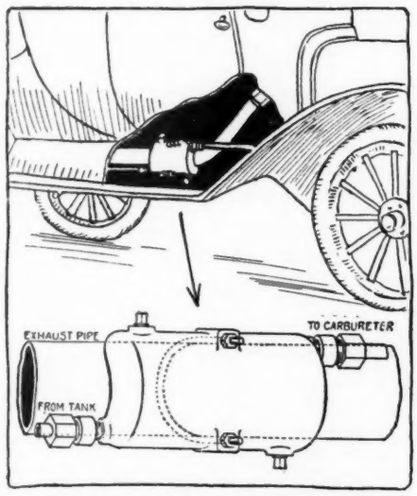
This bumper is made in two sections overlapping at the front and held together by clips, the adjustment for width being made by increasing or decreasing the amount of overlap. The amount of projection forward is regulated by moving the bumper backward or forward on the frame. The angle is also separately adjustable. Spring-tempered steel is the material used and clips and brackets are provided to fit practically all cars on the market. The Ford type sells for $6 when finished in black enamel with nickeled or brass clips and for $8 when nickel or brass plated with black clips.—Metal Stamping Co., Long Island City, N. Y.



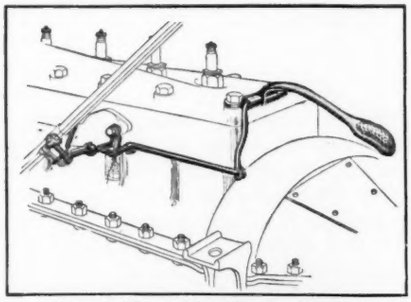
A. B. neutral lever lock



Ieco Steer Warms applied to wheel



Perkins vaporizer on exhaust pipe



Humboldt accelerator for Fords

Perkins Fuel Vaporizer

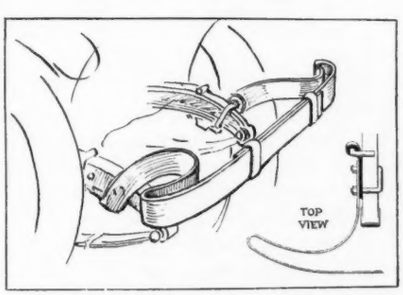
The Perkins vaporizer is a small casting with a chamber through which the gasoline passes on its way to the carbureter, the casting being clamped to the exhaust pipe and let in on the fuel line between tank and carbureter. The gasoline reaches the carbureter at a high temperature and is easily vaporized without the use of hot air. It is also filtered in passing through the casting. Solderless connections are used and the makers claim that the device, which can be installed in ½ hr., effects a considerable saving in fuel. The vaporizer sells for $3.—United States Agency, Inc., Boston, Mass.

Humboldt Accelerator for Fords

This device employs a pedal pivoted on the rear end of the Ford engine which actuates the throttle through an arm and connecting rod, permitting foot control of speed. The pedal, which is of hard rubber baked enamel finish, does not interfere in any way with the removal of the floorboards. Price, $1.—Humboldt Machine & Stamping Co., Long Island City, N. Y.

Hilton Hammock for Babies

To provide a secure resting place for baby while on automobile tours the Hilton hammock has been designed to clip to the robe rail and safely hold the little one with all the comforts of home and without the necessity of taking up some of the ordinary passenger space. The hammocks are designed to fit any make of car and are provided with sun and windshield. On the under side of the hammock are pockets for milk bottles, etc., and plenty of space is provided for articles of clothing.—Hilton Hammock Co., San Francisco, Cal.



Lyon adjustable bumper of spring steel

The FORVM

CLAIMS THAT BALL BEARINGS ARE BEST FOR TRANSMISSIONS—ARGUING THE ADVANTAGES OF CONE CLUTCHES AS COMPARED WITH DISK

Ball Bearings Lead

By J. J. Jennings,
[*New Departure Mfg. Co.*]

EDITOR THE AUTOMOBILE:—In discussing ball bearings in gearsets in your issue for Nov. 18, one of your writers made a statement with reference to ball bearings as compared with roller bearings with which we cannot agree.

In broadly judging a country-wide trend of design, we must consider cause with effect as designers have to allow practical necessity to temper their ideal. If, for instance, they aim for quietness alone in the gearbox and to attain this, use plain bearings throughout at the expense of long life and efficiency, they are risking the car reputation by losing the confidence of the car owner. If we aim at quietness alone, we might have mufflers the size of gas tanks and gears of rubber.

Plain Bearings Originally Used

Let us review the history of gearbox design as to bearings: Originally plain bearings were used at great expense of fitting and scraping in, but they absorbed too much power through friction, which also caused wear, so that when ball bearings became practical, they also became at once popular. As other noises became less, the hum of the gearbox became more pronounced. As car prices dropped, high grade bearing cost became less attractive. Then was the transmission engineer confronted by the question of how much to sacrifice efficiency and life to quietness and price.

His decision was the natural one; to reduce cost where loads were least. Hence, the loss of countershaft and pocket bearing positions by ball bearings in many moderate-priced car gearboxes, but where car quality has been maintained, the ball bearing is still in use even in the least loaded positions and since no objectionable noise would be tolerated in these higher grade cars, it is evident that the blame for being noisy was largely thrust on the ball bearing by carelessness in surrounding parts, rough gears, poor shaft alignment and resonant boxes.

We take exception, therefore, to the statement that ball bearings are losing popularity due to their noisiness or that plain bearings or roller bearings are likely to supplant them through equal efficiency, greater quietness and less cost. The ball bearing still holds important gearbox positions in the great majority of cars of any price.

Clutches and Gear Gates

By Marshall P. Slade

EDITOR THE AUTOMOBILE:—In your article on Gearsets, published Nov. 18 occurs the sentence "Where the cone clutch fails is in making a quick shift from high to intermediate, for it cannot be speeded up without a double pedal action, which very few drivers ever learn to perform."

In my experience the cone clutch is quite free from the objection mentioned, while the disk clutch makes gearshifting extremely difficult. I have three cars with cone clutches and find that gearshifting either up or down gives absolutely no trouble whatever. One of the cars has the transmission on the rear axle and therefore the clutch is directly connected to the universal joint and the propeller shaft—a very considerable weight. The other two cars have the gearbox back of the clutch, with a universal joint between. The thrust collars on all of these cars are ball bearing, so that the clutch and parts connected thereto revolve very freely. There are no clutch brakes on any of these cars.

I find that if the clutch is disengaged when the engine is running at a speed corresponding to 25 m.p.h. it continues to spin for 4 or 5 sec.—a considerable time. This is what facilitates gearshifting from high to intermediate—the shift that is the most important of all. Suppose I start up a long steep hill at a speed of 25 m.p.h. When the speed drops to 18-20 m.p.h. I throw out the clutch, pause about 1 sec., and shift into intermediate without the slightest chatter of the gears. During that pause of one second the clutch continues to spin at almost its original speed, while the car rapidly slows down. When the shift is made, therefore, the gears are running at approximately the same speed and there is not the slightest trouble in making the change.

I have also a 1916 model car fitted with a multiple-disk clutch. The gearshift on this car is most troublesome. I find that when the clutch is disengaged it stops almost instantly, due to its light weight and the friction of the thrust collar. The consequence is that with this car it is impossible to change gears quietly when going at a speed of over 12 m.p.h., without recourse to the double pedal action, which you say very few drivers ever learn to perform, and which I say it is outrageous to expect them to perform.

The cone clutch, as originally made, was troublesome to keep in smooth working order, but with cork inserts or springs to permit easy engagement this trouble has been done away with. In my opinion the engineers have been working on the wrong track in striving for lightness in a clutch. What is wanted is a clutch which will continue to spin when disengaged. Theoretically this should make shifting from first to intermediate or from intermediate to high difficult, but as a matter of fact this is not the case. It certainly is not the case with any of the old Stoddard-Dayton cars.

In these days when everything possible seems to be done to make easy the running of a car, it is a great pity that the matter of gearshifting should have taken such a decided step backwards. It does not seem possible that a complicated multiple-disk clutch can be built more cheaply than a cone clutch. Why then, with its manifest disadvantages to the driver, do so many engineers use it?

There is another subject treated in your issue of Nov. 18, namely, gear gates. It seems to me that those manufacturers who have not adopted the standard shift are very short-sighted.

THE AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1915 by The Class Journal Co.

Vol. XXXIII Thursday, December 16, 1915 No. 25

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, Secretary
T. B. Van Alstyne, Advertising Manager
231-241 West 39th Street, New York City

EDITORIAL
David Beecroft, Directing Editor
Donald McLeod Lay A. Ludlow Clayden
J. Edward Schipper Sydney Oxberry
L. V. Spencer, Special Representative, Detroit

BRANCH OFFICES
Chicago—910 South Michigan Ave., Phone Harrison 7707
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—516-517 Swetland Bldg., Phone Prospect 167

Cable Address ---------- Autoland, New York
Long Distance Telephone ---------- 2046 Bryant, New York

SUBSCRIPTION RATES
United States and Mexico ---------- One Year, $3.00
Canada ---------- One Year 5.00
Foreign Countries ---------- One Year 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft. Post-Office or Express Money Order or Register your letter.

The payment of subscriptions will be shown by stamping the date of expiration—the month and year—on the wrapper that carries your paper each week. No other acknowledgment necessary.

Entered at New York, N. Y., as second-class matter.
Member of the Audit Bureau of Circulations.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

The S. A. E. Program

WORKING on the basis that a vigorous 1-day meeting is better than a 3-day meeting, in which the attendance is bound to be poor at any one session owing to the impossibility for all members to visit all the periods, the winter program of the Society of Automobile Engineers should bring valuable results.

Each year sees the work of the standards committee more rapidly accepted by the manufacturer, and the interest in this phase of the work and its importance makes it desirable that a day be set apart during the winter session in which the members of the standards committee can discuss the important phases of this work. It is realized, however, that the entire membership of the society cannot intelligently discuss the highly specialized topics which are often brought to a point in standards committee work. This absence of general interest in discussing the report of a division of the standards committee is often apt to cut into the attendance, as only those who are interested in the topic will remain.

Now that the standards are accepted by mail ballot, it is not necessary to insert standards committee reports between interesting papers in order to have a quorum for voting. The result is that with the standards committee work concentrated in one day, leaving an entirely separate day for the president's address and the professional session, the attendance at the reading of these papers should be much higher, and the chances for even better discussions than heretofore are increased on account of the hoped-for attendance increase.

So far as announced at present, the program of the S. A. E. winter meeting covers a field of wide interest and is one which cannot fail to interest those directly or indirectly concerned with the manufacture of automobiles and accessories. Every promise is made for a short but highly valuable technical session, from which S. A. E. members and associates are not justified in being absent if such absence is avoidable.

Carbureter Evolution

WHILE developments of a mechanical nature have taken place in the carbureter field during the past 12 months, little if anything new, in the basic principles of operation, has been given to the public. Mechanically the carbureter makers have been exceptionally busy altering mechanical details and, in some instances, quite rearranging the components of the instruments to change them from vertical-outlet models to side-outlet ones. This has called for a rearrangement of parts, but not any alteration in basic principles.

The rapidly increasing demand for side-outlet models has resulted in still another mechanical change, namely, the more general use of the hot-air jacket in preference to the water jacket, due to the fact that the waterjacket was necessary to provide the heat needed to prevent condensation in the manifold. With the side-outlet model the manifold has disappeared, and there is no demand for the additional heat, rather the hot-air pipe seems to be entirely adequate.

The demand for more rapid acceleration has been one of the loads imposed on the carbureter designer during the year, and while it has been met by the addition of or duplication of certain parts, there has not been any alteration in first principles. The means used will unquestionably take a place in carbureter design, until more simple extensions of basic principles can perform the desired functions.

The demands of production are exhibiting themselves in the forms of simplified mechanical designs and alterations to make machining and other shop operations easier and fewer. It is creditable to the carbureter fraternity that in these days of vastly increased car production the old-line carbureter makers have been able to keep pace with production and have given instruments of such satisfaction that the car makers have not been compelled to begin manufacture in their own shops.

What is needed is a better classification of carbureter types, perhaps a standardized system of nomenclature having regard for the basic principles on which different types are built. THE AUTOMOBILE has outlined a more or less incomplete system in this issue, a work which could be continued to advantage. The Society of Automobile Engineers, with its international reputation for standardizing activities, has a field of endeavor in this work.

Baker-R. & L. and Owen Merge

New Baker-R. &. L. Co. to Build Owen Magnetic Cars —Continues Electrics

NEW YORK CITY, Dec. 13—A consolidation of the Owen Magnetic Co., this city, manufacturer of the Owen Magnetic car, and the Baker-R. & L. Co., Cleveland, Ohio, has been effected. The new concern will be known as the Baker-R. & L. Co., but the cars to be manufactured will be known as the Owen Magnetic, which will be built in two models. The Baker factory in Cleveland will be given over to the manufacture of Owen Magnetic cars. The R. & L. factory at Cleveland will be used for the manufacture of bodies for the Owen Magnetic and in addition will continue the manufacture of electric cars, which the Baker-R. & L. Co. has been producing.

Capital to Be $5,000,000

The capital of the Baker-R. & L. Co. will be increased from $2,000,000 to $5,000,000. R. M. Owen, who is president of the Owen Magnetic Co., in this city, will be vice-president and director of sales. The General Electric Co., which recently obtained a considerable interest in the Owen Magnetic or Entz patents, will have directors on the board of the Baker-R. & L. Co. because of its interests in the electric transmission used in the Owen Magnetic cars.

Anson W. Burchard, vice-president of the General Electric Co., D. C. Durland and Richard H. Swartout have been elected to the board of directors of the new company, representing the General Electric interests.

The present Owen factory in this city will be continued for development purposes as well as serving as a service department. The assets of the Owen Magnetic Co., however, have all been acquired by the Baker-R. & L. organization.

Six Cylinders 3½ by 5

It has been known for some months that the Baker-R. & L. Co. was producing a gasoline-electric car built under the Entz patents, which are the basic ones in the Owen Magnetic design. This car is a smaller one than the present Owen Magnetic which has been on the market during the past year. The smaller Owen Magnetic will use a six-cylinder motor 3½ by 5 in. bore and stroke with 126-in. wheelbase. The car is claimed to turn in a circle with a diameter of 38 ft. This new car is specially designed to meet the needs of town-car work and is well suited for inside drive types such as sedans, etc. This chassis was developed with a view to meeting the requirements of those owners at present using electric cars.

The Fort Wayne factory of the General Electric is already tooled up to take care of the manufacture of electric units for these two models of Owen Magnetic cars, as well as to manufacture units for other concerns that may be licensed under the Entz patents to manufacture magnetic cars.

Manufacturers Protest New Export Declarations and Procedure

DETROIT, MICH., Dec. 10—Under the auspices of the Board of Commerce, a meeting was held to-day, at which a large number of representatives of many concerns doing an export business were present to protest against the enforcement of the new export declarations and procedure promulgated by the Department of Commerce, and which were to go into effect Feb. 1.

Exporters here claim that the statistical information the government requires could be obtained in a much more simple way and at much less inconvenience, expense, loss of time and business, than the method suggested by the government. It was proposed, and those present approved the idea, to suggest that an advisory board be selected, all the members to be experienced in the practical conduct of export business, and that this board work in co-operation with the government in getting up regulations as to how to procure the information desired by the government.

Among those attending the meeting were: Charles Denby, Hupp Motor Car Corp.; C. F. Carew, Saxon Motor Car Corp.; James Archer, Willys-Overland Co.; H. M. Robbins, Dodge Bros.; Joseph Drake, Hupp Motor Car Corp.; M. J. Breitenbeck, Detroit Steel Products Co.; P. H. Lynahan, American Blower Co.; W. L. Hoagland, chairman of the foreign trade committee of the Detroit Board of Commerce.

Moon Six-Thirty at $1,195

ST. LOUIS, MO., Dec. 9.—The Moon Motor Car Co., this city, has announced the 1916 six-thirty at $1,195, completely equipped.

In many respects the car resembles the six-forty seven-passenger selling at $1,475. The wheelbase, however, is shorter, being 118 in. The 3¼ by 4½ Continental-Moon unit power plant is block cast, with removable cylinder heads. The tires are 33 by 4 and are demountable, with an extra rim on rear.

The new model has a tumble-home type body with convex side and embodying streamline design. Other features of the body are: Deep cowl and instrument board, wide tonneau doors, 22-in., with concealed hinges and concealed locks and 44-in. leg room.

Fisk Buys Federal Rubber Co.

Gets Control After B. C. Dowse Disposes of Interests —H. T. Dunn New Head

MILWAUKEE, WIS., Dec. 13—Rumors of long standing that the Fisk rubber interests of Chicopee Falls, Mass., were negotiating for control of the Federal Rubber Mfg. Co. of Milwaukee, were confirmed Saturday night, Dec. 11, when official announcement was made that B. C. Dowse, president and general manager of the Federal had disposed of his interests and is succeeded as executive by H. T. Dunn, Toledo, Ohio.

It is stated that the Federal company will continue as a separate and distinct organization under its present name, and the change is simply one of ownership.

The board of directors will be at once increased from five to nine members, who are: H. T. Dunn and J. E. Kepperley, Toledo; H. G. Fisk, E. H. Broadwell, G. A. Ludington and E. M. Bogardus, Springfield, Mass., and B. H. Pratt, Herbert A. Githens and Richard Ward, Milwaukee.

Officers have been elected as follows: President, H. T. Dunn; vice-president and general manager, B. H. Pratt; assistant general manager, H. A. Githens; treasurer, H. G. Fisk; secretary and assistant treasurer, Richard C. Ward; comptroller, E. M. Bogardus.

The Federal company operates a large tire and commercial rubber plant at Cudahy, and employs in excess of 2000 workmen. It was established about five years ago, shortly after the consolidation of the G. & J. factories at Indianapolis with the United States Tire Co. Messrs. Dowse, Githens and Ward were formerly associated with the G. & J. During the last eighteen months the capacity of the Cudahy works have been increased more than 50 per cent and much new construction is under way and projected for 1916.

There will be no material changes in the present organization of the Federal company, according to the announcement.

Mr. Dowse intends to maintain his residence in Milwaukee, although he is not ready to discuss his plans for the future at this time.

Schooley Kearns Truck V-P

BEAVERTOWN, PA., Dec. 10—S. W. Schooley has become associated with the Kearns Motor Truck Co., this city, in the capacity of vice-president and sales manager. He was formerly special factory representative for the Atterbury Truck Co.

Many Congressmen Protest Tax

Will Fight Bill to Tax Gasoline and Horsepower if Presented

WASHINGTON, D. C., Dec. 11—A hornet's nest has been stirred up by President Woodrow Wilson in his message to Congress advocating a tax on automobiles and gasoline. To show how some members of Congress stand on the proposition THE AUTOMOBILE correspondent has secured the following expressions of opinion from Congressional leaders:

"I believe it unjust to suggest the taxation of automobiles, thus putting a burden on a great industry now bringing millions into the country. I shall make a vigorous fight on the proposal," said Senator Townsend, of Michigan. Senator Townsend is one of the Senate leaders and wields much influence in the upper body of Congress.

Representative Steele, an Iowa Democrat, says he is absolutely opposed to the proposition of taxing automobiles and gasoline. "All our farmers own automobiles and they will never stand for such a tax," he declared.

"You can depend on it that no automobile or gasoline tax will be levied by this Congress," says Congressman Miller, a Republican representative of Minnesota.

Congressman Humphrey, a Republican of Washington, said he was against all direct taxes. "There is no necessity for such a tax except in war times. I oppose automobile and gasoline taxes," he announced.

"Count me against gasoline and automobile taxes," said Congressman Tavvener, a Democratic representative from Illinois.

Congressman Sloan, a Republican representative from Nebraska, claims that gasoline and automobile taxes would be extremely unpopular in his State. "Half our farmers own machines," he added.

The matter will not come before Congress until the new year, as Congress is about to adjourn for the holiday season.

—

65,000 Cars and Motor Trucks on French Battle Lines

NEW YORK CITY, Dec. 13—There are 65,000 motor vehicles, including both passenger cars and motor trucks, supplying the French Army in France, according to Charles Ryer, who returned to this country from France on the Anchor liner Cameronia.

—

$300,000 Company to Make Electric Steel Castings

MILWAUKEE, WIS., Dec. 11—The demand for electric steel castings from numerous industries, notably manufacturers of automobiles and trucks, has induced several large steel foundrymen of Milwaukee to install electric furnaces and the organization of a new company of considerable size. The Gerlinger Steel Casting Co. of Milwaukee has recently installed an electric furnace producing 6 tons in 24 hr., this being one of the largest installations in the Middle West. The new company is the Electric Steel Casting Co., capital stock, $300,000, organized by L. G. Smith, former manager, and F. G. Wetter, former purchasing agent of the Prime Steel Co., Milwaukee. This concern is arranging to build what will be one of the first foundries in America designed exclusively for electric furnace work. The structure will be 80 by 500 ft. in size and equipped with two 3-ton electric furnaces. It will be ready to make castings about April 15, 1916. Officers of the new company are: President, L. G. Smith; vice-president, Chauncey W. Yockey; secretary and purchasing agent, F. G. Wetter; treasurer, C. F. Taylor.

—

Goodyear Elects Two New Vice-Presidents

AKRON, OHIO, Dec. 10—The Goodyear Tire & Rubber Co. at its annual meeting last week elected two new vice-presidents. Secretary G. M. Stadelman, who has been sales manager throughout the Goodyear upbuilding, was made a vice-president. He continues as sales manager. P. W. Litchfield, a factory manager, was also elected a vice-president. He will continue in charge of the factory operations. The company now has three vice-presidents, C. W. Seiberling, formerly vice-president, being re-elected.

A. F. Osterloh was elected secretary, stepping into the place from that of assistant secretary. He is also assistant sales manager.

The other Goodyear officers for 1916 are: President, F. A. Seiberling; Treasurer, F. H. Adams; Assistant Secretary and Assistant Treasurer, W. E. Palmer; and Second Assistant Treasurer, H. J. Blackburn.

In his statement to the stockholders, Mr. Seiberling said that the company had made over 2,000,000 tires in the year just closed.

—

Canadian Goodyear Tire Co. Issues New Preferred Stock

AKRON, OHIO, Dec. 9—The Goodyear Tire & Rubber Co. of Canada has issued $850,000 7 per cent preferred stock. The price is par and accrued dividend. The proceeds of the issue will enable the Canadian company to repay advances made by the Goodyear Tire & Rubber Co. of Akron, which owns all of the common stock of the Canadian company except small amounts purchased by employees of the latter. The Akron company has invested about $1,700,000 in its Canadian subsidiary, which was formed to overcome a high restrictive tariff.

The new issue of Goodyear of Canada preferred is redeemable after Jan. 1, 1919, at 110 and accrued dividends. Net earnings have been running about four times the dividend requirements, including the stock to be sold. Net sales for the year ended Sept. 30 were $2,370,914 and net income $323,874. After all charges there was a surplus of $235,135.

Canadian Ford Capital $10,000,000

600% Stock Dividend—Seven Shares of New for One of Old

DETROIT, MICH., Dec. 14—The capital stock of the Ford Motor Co. of Canada, Ltd., was increased to-day from $1,000,000 to $10,000,000. A 600 per cent stock dividend will be distributed, stockholders receiving seven shares of the new stock for every share of old stock they hold, which will make the total outstanding capital $7,000,000.

—

G. M. Board Meeting First Week of Jan.

NEW YORK CITY, Dec. 10—The next meeting of the board of directors of the General Motors Co. will be held during the first week of January, and dividend action on the common stock is expected at that time. The executive committee will meet within a week.

—

Bucyrus Rubber Elects Directors

BUCYRUS, OHIO, Dec. 9—The annual meeting of the stockholders of the Bucyrus Rubber Co., this city, was held here recently, at which the following nine directors were elected: P. J. Carroll, Jacob Colter, W. A. Blicke, George Donnenwirth, A. B. McVay, A. G. Stoltz, H. A. Paxton, Col. C. W. Fisher and M. R. Lewis.

—

Fahrig Exports Bearing Metal

NEW YORK CITY, Dec. 10—The Fahrig Metal Co., this city, sole manufacturer of Fahrig anti-friction metal, a special process tin base alloy, composed of 10 per cent copper and 90 per cent tin, is shipping this metal to France for the bearings of the Lorraine de Dietrich motors. The French company has adopted this material for its regular motors as well as its aeronautical motors.

—

Beck, of Hayes Wheel, Promoted

JACKSON, MICH., Dec. 9—Charles L. Beck, who has been general foreman of the Hayes Wheel Co., has been appointed assistant general manager of this concern's new plant in Anderson, Ind., where from 600 to 700 men will be employed when the works will be in full operation. His successor here is Henry Flick, who is assistant manager of the local plant and has been in the wheel business for the last thirty years.

—

Oregon Has 23,581 Cars

PORTLAND, ORE., Dec. 11—The total count of registered automobiles in the State of Oregon for 1915 is 23,581, as compared with 16,347 for 1914.

Gasoline Continues Rise

Recent Advances Make It from 40 to 60% Higher Than Last Summer

NEW YORK CITY, Dec. 11—The Standard Oil Co. of New York yesterday advanced the price of gasoline in this city 1 cent a gal., making the tank wagon basis 20 cents a gal. It is expected that the advance of 1 cent a gallon in price of gasoline will be followed by the posting of a 1-cent advance by all Standard Oil and independent companies throughout the eastern territory. Prices were advanced 1 cent a gal. at all stations in South Carolina and Louisiana.

The Standard Oil Co. of Kentucky has advanced the price 1 cent a gal., effective Dec. 13, making tank wagon basis 18 cents.

New England prices have been advanced 1 cent by the Standard Oil Co. to 21 cents a gal. in all the states with the exception of Connecticut which remains at 20 cents. Owners in Massachusetts are wondering what the outcome will be of the higher prices asked for gasoline. Within the past six months there has been a 36 per cent increase in its cost, and since January last it has jumped more than 60 per cent. The Standard Oil Co., the Gulf Refining Co. and the Texas Co. are united in that state on the price. This will mean 25 to 26 cents a gal. to the automobile owners.

Toronto gasoline is now quoting at 25 cents. As there are over 80,000 automobiles in Canada, and each car consumes on an average 400 gal. per year, this will mean a cost to the owners of Canada of nearly $3,200,000 more annually to operate their cars.

The advance made by Texas Co. on Dec. 11 in Chicago, has been met by the Standard Oil Co. of Indiana, which has advanced its prices 1 cent, tank wagon basis. The price at Chicago is now 15½ cents.

The Atlantic Refining Co. in Philadelphia has raised its price 1 cent to 19 cents a gal., tank wagon basis.

A 2-cent rise has been made in Mississippi and a 1-cent rise in Atlanta, Ga. Tank wagon basis is now 18.5 cents in Mississippi and 21 cents in Atlanta.

Gasoline prices in Portland, Ore., are now quoting at 13½ cents, and the retail prices range from 14 to 15½ cents, according to the margin of profit demanded by the respective dealers.

Gasoline in Kansas City, tank wagon basis, has been advanced 1 cent a gallon. The Standard Oil price is now 13.8 cents and independents 14.8 cents. An advance to 20 cents a gallon this winter is predicted there.

The price of gasoline at filling stations has been advanced to 14.9 cents a gallon by both the Standard Oil Co. and independents.

The Atlantic Refining Co. has advanced the price, tank wagon basis, 1 cent to 20 cents a gallon.

The advance follows an increase of 10 cents in the price of crude oil in Oklahoma and Kansas oil fields, now selling at $1.10 per barrel.

—

Rittman Talks in Detroit on Gasoline Process

DETROIT, MICH., Dec. 11—Dr. Walter F. Rittman of the United States Bureau of Mines spoke to-night at the Board of Commerce on the subject of gasoline and explained his patented process.

The Rittman process and methods were described in detail in THE AUTOMOBILE for March 25.

Some of the reasons given by Mr. Rittman for the shortage of gasoline are as follows: The tremendous increase in sales of automobiles in this country, it being stated by the lecturer that more than the production of automobiles in American factories averages 3000 a day now. A second important reason given is that the export business in oil now averages 250,000,000 gal. a year. The third big reason for the shortage, according to Mr. Rittman, is the fact that the Cushing oil fields in Oklahoma, which a year ago produced 300,000 barrels of oil a day, or even more, are gradually drying out.

—

New Truck Company in Detroit

DETROIT, MICH., Dec. 13—A new truck concern is being formed here, and G. E. Porter, who was chief engineer of the J. C. Wilson Co., is to be one of the organizers. A plant has been secured at Howell, Mich.

—

W. McK. White with Lozier

DETROIT, MICH., Dec. 11—William McK. White, formerly with the Dayton Motor Car Co., Dayton, Ohio, has been appointed sales manager of the Lozier Motor Co.

—

McBeth Westcott Advertising Mgr.

RICHMOND, IND., Dec. 10—R. S. McBeth has been appointed advertising and publicity manager of the Westcott Motor Car Co., this city.

112,000 Cars in Bay State

One Car to 32 People—One Licensed Operator to Each 27—1742 Dealers

BOSTON, MASS., Dec. 11—The fiscal year for the Massachusetts Highway Commission closed Dec. 1, and the figures show that the automobile registration receipts ran up close to $1,250,000; that there is one car to each thirty-two people in the Bay State and one in every twenty-seven people is licensed to operate a motor car. Statistics show that there has been a 33 per cent increase in the number of machines registered; a 35 per cent gain in the number of drivers licensed and a 30 per cent addition to the amount of money turned in to the State from registrations.

There are now just about 112,000 motor vehicles registered in the Bay State. These are divided into some 90,673 passenger cars; 11,960 commercial vehicles and some 9000 cars belonging to manufacturers and dealers. A year ago the figures showed about 85,500 cars in all, including 69,010 passenger vehicles, 8236 trucks and about 7800 cars belonging to the trade. The trucks alone show a gain of about 45 per cent.

Last year there were 1518 makers and dealers licensed and this year the figures show 1742, or a jump of 224. And it must be remembered that the Highway Commission is pretty strict now as to allowing any people to assume the rôle of dealers and so get registered unless they are doing a bona fide business.

133,935 Licensed Operators

There are now 133,935 people authorized to operate cars in Massachusetts, which, based upon population, gives one out of every twenty-seven people the right to drive cars.

The biggest gain has been in the number of new licenses issued, for a year ago 26,858 original licenses were given out while the number this year has jumped to 44,656. The renewals show a gain of 21 per cent, or from 72,674 to 89,279. The fees have run up to $1,205,420.19. This is the first time that the motor receipts have reached above the $1,000,000

Massachusetts Registration Statistics Compared

	1904	1914	1915	One Year Gain
Motor vehicles	*4,889	**77,246	***102,633	25,387
Motorcycles	533	8,161	9,520	1,359
Makers and dealers	102	1,518	1,742	224
Licenses, operators and chauffeurs	6,869	26,858	44,656	17,798
Renewals, operators and chauffeurs	None	72,674	89,279	16,605
Examinations	None	7,497	10,523	3,026
Receipts	$24,490.50	$925,964.75	†$1,205,420.19	$279,455.44

*Registered. About 7000 unregistered.
**Including 8236 commercial vehicles.
***Including 11,960 commercial vehicles.
†Does not include fines which will total about $50,000.

mark. When the fines are computed and added it will make the total about $1,250,000, so the gain will be more than 30 per cent, the total receipts a year ago being $925,964.75.

4899 Cars in 1905

If one looks back a decade and notes the figures it shows a wonderful growth for in 1905 there were but 4899 cars registered with 102 dealers and manufacturers. The private operators numbered 3736 and the chauffeurs 3133. At that time the annual registration law was not in force and it was estimated that there were about 12,000 cars in the State. The yearly receipts totaled $24,490.50. Comparative figures appear in the tabulation on page 1116.

—

American Wagon to Make Farm Truck Bodies

DIXON, ILL., Dec. 9—The American Wagon Co. of Dixon will soon commence the manufacture of a convertible farm wagon body which also will be available for the chassis of a motor truck. Plans and specifications are now under discussion, and as soon as the models are produced which accord with the ideas of the company, production will commence upon an extensive scale. The decline in the demand for farm wagons forces the company to adopt the new side line.

—

Box Co. to Make Trucks

SHEBOYGAN, WIS., Dec. 11—The R. L. Frome Mfg. Co., Howard's Grove, Sheboygan County, Wis., a large producer of boxes and other packages and containers, has decided to engage in the manufacture of motor trucks. A large addition is now being made to the plant to accommodate the new truck shops. Details of the new truck will be disclosed within a short time. Experimental work has been under way for more than a year. The truck will be a light delivery type, employing worm-gear drive.

—

Beech Creek To Make Truck

BEECH CREEK, PA., Dec. 13—A new four-wheel-driven, four-wheel-steered truck is to be manufactured by the Beech Creek Truck & Auto Co., of this city, the first model of which was recently tried out here. The feature of the new truck is that both front and rear axles are pivoted to the frame at their center points by means of large ball-and-socket joints. These permit the entire axles to turn when rounding a corner, allowing the wheels to give a straight pull on the axle.

Wis. to Buy 30,000 Cars in 1916

—

80,000 Registered for 1915 and 110,000 Total Estimated for 1916

MADISON, WIS., Dec. 13—Wisconsin will absorb 30,000 cars during 1916, according to the estimate made by the office of the Secretary of State, who is in charge of registrations. The secretary plans to issue 110,000 licenses to private owners next year, based on a registration of approximately 80,000 for 1915.

Interesting statistics on Wisconsin registrations have been compiled by A. J. Cobban, registry clerk, Secretary of State's office. The figures show that during 1913, Wisconsin absorbed 10,068 new cars; in 1914, 18,514 new cars, and during the year now closing, 26,631 new cars. This goes to show that the annual gain over the previous year has been uniform, being in the neighborhood of 8000. While it would appear inconsistent to estimate a gain for 1916 of only 3400 compared with 1915, in the face of 8000 gains for three successive years, Mr. Cobban explains that the car market necessarily becomes more restricted year after year and the percentage of gain declines by the same token.

It is interesting to note that while the number of dealers who registered in 1914 was 191 less than the 1913 registry, a gain of 381 is shown for 1915.

The Secretary of State is figuring on issuing 1600 dealers' licenses next year, which is only seventeen more than the 1915 registry, but as has often been proved, the early estimates are generally far below the actual registration.

A comparative tabulation of registrations for the four years ending in December, 1915, appears herewith.

—

Car Sales Good in Manitoba

WINNIPEG, MAN., Dec. 8—Probably no figures could better indicate the state of Winnipeg's prosperity in a year of what has been termed financial depression than those in the municipal commissioner's office in the Parliament Buildings relating to automobiles. Statistics show up remarkably in comparison with former years and demonstrate that the automobile business is, if anything, busier than ever. The Province of Manitoba shows a record increase in the number of cars, for over 2000 new automobiles have been purchased during 1915 and the revenue of the Province has been increased in a corresponding proportion.

Manitoba is receiving this year upwards of $100,000 from the automobile business alone. Licenses have been granted to 9073 automobiles up to the end of September and it is anticipated that fully 500 more applications will be shown when the returns for the last 3 months of the year are tabulated at the end of December.

The straight license fee of $10 makes a total of $90,730 for the motor cars already registered. In addition licenses have been granted to 1144 chauffeurs at $5 per head, making a total of $5,720. Only 7000 licenses for automobiles were granted in the Province of Manitoba last year, showing that from April 30 up to the end of September 1915, only 6 months in all, 2073 cars have been purchased. Some most striking features have been compiled by the department with a view of showing the distribution of cars throughout the Province and also with a view to showing the number of makes of cars in use in Manitoba. The census of makes of cars operating in Manitoba during the past year numbered 174. During the present year the various numbers given the departmental census of makes of cars has been vastly increased and the increase is largely in the country where the farmers have been able to purchase cars by reason of the increased crops and prices and the general increase of prosperity.

—

1916 Tractor Tests in August at Bloomington

CHICAGO, ILL., Dec. 10—At a meeting of representatives of the leading tractor companies of the Middle West, held in Chicago, it was voted to accept the offer of Bloomington, Ill., for the tractor demonstration of 1916, to take place in August. Owing to the great expense in putting on these demonstrations, it was decided to hold but one in each State annually.

—

Velie To Add 1200-Pounder

MOLINE, ILL., Dec. 10—A 1200-lb. truck is to be added to the line of heavier Velie trucks, made by the Velie Motor Vehicle Co., Inc., this city, it will be ready sometime in the coming spring.

—

Republic Internal-Gear 5-Tonner

DETROIT, MICH., Dec. 10—A 5-ton internal-gear-driven truck is to be brought out by the Republic Motor Truck Co., Alma, Mich.

—

Iowa a New Truck

OTTUMWA, IOWA, Dec. 13—The Iowa Motor Truck Co. was recently formed in this city for the manufacture of 1- and 1½-ton trucks of the internal-gear-driven type. The truck will be known as the Iowa and will be sold in the Middle West.

Wisconsin Registration Statistics Compared

Class of License	Annual Fee	1912	1913	1914	1915
Automobiles	$5	24,578	34,646	53,160	79,791
Motorcycles	2	4,060	6,120	7,881	8,601
Dealers	10	1,052	1,393	1,202	1,583

500 at Anti-Glare Device Test

Small Bulb for Dimming Claimed Not to Meet Mass. Law.

BOSTON, MASS., Dec. 9—The Massachusetts Automobile Club last night conducted an educational test on anti-glare devices before 500 motorists for the purpose of observing whether the different non-glare devices really eliminate the glare or not. The tests were conducted with the sanction of the Massachusetts Highway Commission, which has the power of regulating these devices, but Col. Sohier, chairman of the commission, has refused to make any official statement as to whether or not any particular devices meet the requirements of the law. The tests were conducted in a closed room 140 ft. long and of width sufficient to test the devices. The floor was painted black to represent an oiled roadway and a stand was erected at one end on which the headlights were mounted at the ordinary height above the ground. At each side of the stand at an angle of 45 deg. or 10 ft. on the side and 10 ft. in front were two wax figures to represent pedestrians. Just 50 ft. in front of the light stands was a crossbar 3½ ft. high. At the extreme end of the imitation roadway stood another figure supposed to be a pedestrian. These conditions were intended to represent as nearly as possible the law requirements, in that they will not glare or dazzle 3½ ft. above the ground or 50 ft. ahead, but will clearly show up objects 150 ft. ahead and standing at either side of the road.

No Official Results

No official results were given but the sentiment seemed general among all the spectators that the present-day lights with a small bulb, that is, the dimmer arrangement, will not satisfactorily meet the requirements of the Massachusetts law.

The club intends to retain its testing place for some months so that manufacturers of other devices will have an opportunity of making tests whenever desired.

Testing the Devices

In the tests some of the non-glare devices would pick up the side objects but were not strong enough to make the objects at 150 ft. clear. In other cases the devices gave sufficient light at 150 ft., but were glaring 3½ ft. above the ground at the 50-ft. line. In several cases where the lens was frosted all over the glare was eliminated but there was not sufficient light to show objects 150 ft. distant.

Some of the dimming devices tested by the means described were:

Aderente Non-Blinding Co., Jersey City, N. J.
Opalite Deflector, New York.
Legalite Lens, Boston, Mass.
J. M. Non-Blinding Lens, New York City.
Haskins Lens, New York.
Reliable Sales Co. Lens.
Perrin No Glare.
Osgood Auto Light Deflector.
Greenwood Silvered bulb.
Lancaster Lens frosted.
Jones Lens.
Gray & Davis Frosted Bulb.
Gray & Davis frosted top and bottom with a clear surface slit horizontally.
Lancaster lens all frosted.
Lancaster half frosted from top.
Haskins lens all frosted.
Haskins open-eye lens.
Solar Eclipse lamp.

—

Rough Ozark Section of Mo. Buys Cars

KANSAS CITY, MO., Dec. 10—The Ozark section of Missouri, rough and hilly, the most backward section of the State, has started to purchase automobiles. The total for the State now is 76,257, an increase from 54,000 from the registration of a year ago.

Greene County, in the center of the Ozark section with Springfield as its county seat now boasts a registration of 1041 cars and, outside of the cities of St. Louis and Kansas City, stands fourth in the State ranking. The registration in the other Ozark counties, none of which has any cities in excess of 2000 or 3000 population is as follows:

Barry 252; Barton, 379; Camden, 37; Carter, 1; Cedar, 139; Christian, 138; Dade, 177; Dallas, 71; Douglas, 18; Hickory, 48; Howell, 145; Laclede, 94; Lawrence, 415; Oregon, 49; Ozark, 10; Polk, 177; Pulaski, 52; Shannon, 9; Stone, 46; Taney, 10; Texas, 65; Webster, 83, and Wright, 79.

Many of these counties are not touched by railroads and practically none of them have ever improved their roads. The highways through most of them follow the ridges or hollows, filled with stones and ruts. The entire district is one abounding in fish and game and is but little settled.

St. Louis leads, in the State registration with a total of 16,362 cars. Kansas City is second with 9289. The registration fees this year have amounted to $322,383, a record for Missouri.

—

New Era Capital $200,000

JOLIET, ILL., Dec. 11—The capital stock of the New Era Engineering Co. of Joliet, has been increased to $200,000. A foreign department office has been opened at 44 Whitehall Street, New York City, J. B. Crockett being placed in charge. Orders have been received for $1,500,000 worth of cars. J. P. Buckley of Detroit, has been elected vice-president and factory manager. The company was organized in April, 1915, and now has a semi-monthly payroll of $1,300.

Revival in Mexican Trade

Large Field for Trucks—Large Demand for Cars Expected

EAGLE PASS, TEX., Dec. 10—That the automobile trade with Mexico is on the eve of a big revival is shown by the movement of this class of traffic through the Eagle Pass and Laredo gateways during the last few days. During his recent visit to the border First Chief Venustiano Carranza purchased six car loads of new automobiles, and the shipment passed through here a few days ago destined to different parts of Mexico. For his personal use, and the use by his staff officers General Carranza placed orders in San Antonio for six up-to-date seven-passenger, eight-cylinder cars and three four-cylinder touring cars. The former order included seat cover equipment, bumpers and Silvertow cord tires. The cash price paid for the nine cars was $15,000.

With the return of normal business conditions in Mexico automobile dealers in all Texas border towns expect an unprecedented rush of orders for cars.

—

1,000,000 Model T Fords

DETROIT, MICH., Dec. 10—At 1:55:30 this afternoon car No. 1,000,000 of the model T Ford was completed at the Ford Motor Co. main plant. The first model T was made in 1908. Including other models, the company has made a total of approximately 1,080,000 Ford cars, which have been made and sold up to this afternoon. Ford officials estimate that 750,000 of the 1,000,000 model T cars are in operation in the United States.

Based on the average value of the model T roadster, touring car and town car of the last five years, the value of the model T cars made to date is over $668,000,000.

—

Ford Motor Co. Buys 20 Acres of Ground in Detroit

DETROIT, MICH., Dec. 10—Vice-President Frank L. Klingensmith of the Ford Motor Co. confirmed to-day the purchase by the Ford company of property aggregating about 20 acres of ground on Woodward Avenue and adjoining the big plant to the north.

Negotiations had been pending for several months and the deal is said to involve between $500,000 and $1,000,000, the exact figures not being made public. The property includes land of the Braun Lumber Co., the H. W. Harding Lumber Co., the United Fuel & Supply Co. and

the St. Francis Home of Orphan Boys.

For the present, it is said, that only provisions will be made for larger railroad switching facilities and to embellish the northern approach to the Ford plant.

With the newly acquired property the Ford company has a frontage of about 1490 ft. on Woodward Avenue, which does not include property now being used as recreation grounds.

—

Harrow Tractor Co. Organized with $300,000 Capital

DETROIT, MICH., Dec. 8—The A. T. Harrow Tractor Co. has been formed and incorporated, its capital stock being $300,000 and its officers and incorporators A. T. Harrow, president; H. M. Sweet, vice-president and E. A. Cobo, secretary-treasurer. This new concern has taken over the Michigan Tractor Co., which was recently organized by the same parties interested in the Harrow company.

The company is now endeavoring to find a factory either in Detroit or vicinity in which to start making its tractor, which was invented by Mr. Sweet, and which is to sell at $950 without the plowing outfit and at $1,100 with this accessory. The temporary headquarters of the concern are at 12 Jefferson Avenue, East.

—

To Test Michigan Law

DETROIT, MICH., Dec. 11—As there has been a good deal of controversy about the new Michigan automobile tax law, which goes into effect Jan. 1, it being claimed that the law is unconstitutional, a test case will be taken to the courts. Pending a decision, it has been announced by Secretary of Police, George Walters, that motorists may continue to use their cars with their present or 1915 license number. If they care to, they may secure the 1916 license plate and pay their tax according to the new law, and in case the latter is declared void, they will receive the difference in excess over the present taxation.

—

Another Injunction for Prest-O-Lite

LOUISVILLE, KY., Dec. 10—A preliminary injunction has been issued here in favor of the Prest-O-Lite Co., Inc., Indianapolis, Ind., in its suit against the Sun-Lite Gas Co., Thomas F. Hackett, C. A. Tucker and J. J. Moran and Margaret Moran, charging illegal refilling of Prest-O-Lite tanks. The injunction compels the refillers to destroy the identity of the Prest-O-Lite cylinder, to convert it into a properly branded Sun-Lite tank and then forbids the fraudulent substitution of such a tank upon a Prest-O-Lite user.

Thropp Patent Suit Dismissed

—

New Testimony Fails to Change Decision in Litigation vs. U. S. Tire

NEW YORK CITY, Dec. 10—The suit of the De Laski & Thropp Circular Woven Tire Co. against the United States Tire Co. was dismissed by Judge Hand this week. This case was an effort on the part of the De Laski & Thropp company to secure the upholding of its tire core patent by means of new testimony, following a decision of the Circuit Court of Appeals holding the patent invalid because anticipated.

The patent in question covers molds used in the manufacture of tires by practically the entire industry, and if upheld would give a practical monopoly to the owner which would permit the exaction of large sums.

Judge Hand agrees with the decision of the Circuit Court of Appeals that the patent was anticipated, referring to the use of tire molds by the Goodrich company, and points out that the Fisk cold press of 1903 and 1904 antedates Thropp's press, the date of invention of which the testimony sought to carry back from Feb. 1, 1905, to January, 1904. The opinion also states: "I have no hesitation in finding that the Fisk mold antedated Thropp's 1904 mold. I do not, of course, mean that the Fisk mold was itself an anticipation of the patent, but if Thropp may carry back to January, 1904, then he is met by an apparatus as near to his invention as that by which he would carry it back."

—

Lee Tire & Rubber Corp. Formed—To Increase Output

CONSHOHOCKEN, PA., Dec. 10—The formation of the Lee Tire & Rubber Corp., this city, has completed the refinancing of the Lee Tire & Rubber Co., which has provided for a large increase in its output. The new company has 100,000 shares issued of an authorized amount of 150,000 shares, no par value. This stock will be controlled and managed by the same officers that have controlled the old company. The output is to be increased from the present rate of 200,000 tires a year to at least 400,000. Of the 100,000 outstanding shares, 67,000 shares are being offered at $50 a share, and the 33,000 shares are being retained by officers and interests identified with the company. All of the property, assets, and business of the old company are taken over.

The officers selected for the new company are: President, A. A. Garthwaite; vice-president, J. J. Watson, Jr.; secretary, Samuel Wright; treasurer, H. C. Coleman.

The new board of directors of the company are as follows: S. B. Fleming, president of the International Agricultural Corp.; A. A. Carthwaite, president of the Lee Tire & Rubber Corp.; J. J. Johnson, president of Johnson & Johnson, New Brunswick, N. J.; S. H. Miller, vice-president of the Chase National Bank; G. M. P. Murphy, vice-president of the Guaranty Trust Co.; J. W. Prentiss of Hornblower & Weeks; J. J. Watson, Jr., vice-president of International Agricultural Co., and Joseph Wayne, Jr., president of Girard National Bank, Philadelphia.

The statement of earnings for the ten months ended Oct. 31, last, follows:

Net sales	$2,794,025
Cost of sales after depreciation	1,991,691
Gross profits on sales	802,334
Profit on materials sold	1,100
Total profits	803,434
Selling, administration and general expenses	364,018
Balance	439,416
Add: Discount on purchases $14,740	
Income from properties 3,758	18,498
Balance for interest	457,914
Interest paid	45,439
Surplus	$412,475

The balance sheet of the company, with the new financing accomplished, is as follows:

Assets

Cash	$127,240
Accounts and notes received	334,436
Inventories	963,701
Total current assets	$1,435,378
Deferred debts	8,558
Plant and equipment	1,094,987
Patents, trade marks, etc	400,300
Total	$2,939,524

Liabilities

Current liabilities	$117,758
Reserves	188,175
Stock 100,000 shares in par value	2,638,591
Total	$2,939,524

—

Jameson To Take Two Years' Leave of Absence

TOLEDO, OHIO, Dec. 10—For several months C. S. Jameson, vice-president and director of the Willys-Overland Co., this city, has been in ill health and has finally decided to relieve himself of all commercial responsibility and obtain a much needed rest. That he may carry out this intention he has resigned as an officer and director of the Willys-Overland Co. to take a two years' leave of absence. Mr. Jameson leaves shortly for Florida where he will spend the winter.

—

Premier Cushion Spring Co. Formed

DETROIT, MICH., Dec. 8—The Premier Cushion Spring Co. has been incorporated, its capital stock being $25,000. The incorporators and officers are William D. McCullough, president; William A. Falls, vice-president and Joseph A. Schulte, secretary-treasurer. The first two members were formerly with the Detroit Wire Spring Co. and Mr. Schulte is manager of the local Cadillac branch.

Hupp Gains 97% in November

1915 Production 50% Over 1914 to the End of That Month

DETROIT, MICH., Dec. 9—Production and sales of the Hupp Motor Car Co. during November were 97 per cent greater than in November, 1914, and show an increase of 47 per cent over the record of last October. Taking the production for the 1915 season to the end of November, the increase in production has been 50 per cent as compared with the same period of 1914. While the material market, according to the Hupp officials, is still a cause for holding back production, it is not quite as serious as it was during the summer and fall months. Complaints now coming are rather owing to slow deliveries and this is due to a shortage of railroad freight cars, thousands of which are now tied up in the East.

—

Steel Higher

NEW YORK CITY, Dec. 14—Automobile material prices were steady last week. Bessemer and open-hearth steel each went up $1 a ton to $30 and $31 respectively. These metals have seen a steady rise, the price in June last being $19. Fine up-river Para fluctuated throughout the week and closed yesterday at 71 cents. The recent rise in price of rubber, it is believed, will cause a rise in tire prices. Prices, however, in the rest of the materials that are included in the structure of tires, have made higher advances proportionately than rubber, and it is stated that these will have a greater influence on a rise in tire prices than will rubber, of which the manufacturers are well supplied with.

Gasoline in this city has risen 1 cent to 20 cents a gal. to garage men. Oil men are predicting that Pennsylvania crude oil will go to $2.50 a barrel before many months. This is of interest in connection with the prospect of a higher price of gasoline, as Pennsylvania petroleum is generally credited with carrying the highest content of gasoline. Pennsylvania crude is at present quoting at $2.10 a barrel, while that from Kansas is selling at $1.10, a rise of 10 cents taking place to-day.

The undertone in copper continued firm throughout the week. Prices remained steady at 19½ cents in both electrolytic and lake. Aluminum remained constant at 56 cents. The Virgin quality, which is 99 per cent pure is held at 58 cents. Lead was firm though lower at $5.20 per 100 lb.

—

Consolidated Car Stock Par at $10 per Share

DETROIT, MICH., Dec. 9—As reported briefly in THE AUTOMOBILE for Dec. 2, the Consolidated Car Co., this city, which makes the Abbott-Detroit, has increased its capital stock to $500,000. This stock will be sold at par, $10 a share, not through brokers, but by the members of the company. The former capitalization of the company was $200,000 and it is intended to sell $200,000 of the new stock and hold the balance of $100,000 in reserve. It is said that about $135,000 worth of the stock has been thus far subscribed for. Of the new model six-44 brought out recently, it is planned to build 2000 the first year.

—

Overland Meeting Jan. 14 to Consider Increasing Capital

TOLEDO, OHIO, Dec. 13—A special meeting of stockholders of the Willys-Overland company, will be held Jan. 14, in this city, to consider and take action upon a proposal to increase the authorized capital stock of the company to $75,000,000, consisting of $50,000,000 common and $25,000,000 new preferred stock. Action will also be taken in regard to a proposal to make this preferred stock redeemable and convertible into common stock.

Daily Market Reports for the Past Week

Material	Tues.	Wed.	Thur.	Fri.	Sat	Mon.	Week's Ch'ge
Aluminum	.56	.56	.56	.56	.56	.56	...
Antimony	.38½	.38½	.38½	.38½	.38½	.38½	...
Beams & Channels, 100 lb.	1.97	1.97	1.97	1.97	1.97	1.97	...
Bessemer Steel, ton	29.00	29.00	30.00	30.00	30.00	30.00	+1.00
Copper, Elec., lb.	.19½	.19½	.19½	.19½	.19½	.19½	...
Copper, Lake, lb.	.19½	.19½	.19½	.19½	.19½	.19½	...
Cottonseed Oil, bbl.	8.56	8.34	8.32	8.32	8.24	8.24	—.32
Cyanide Potash, lb.	.23	.23	.23	.28	.28	.28	...
Fish Oil, Menhaden, Brown	.48	.48	.48	.48	.48	.48	...
Gasoline, Auto, bbl.	.19	.19	.20	.20	.20	.20	+.01
Lard Oil, prime	.92	.92	.92	.92	.92	.92	...
Lead, 100 lb.	5.22½	5.20	5.20	5.20	5.22½	5.20	—.02½
Linseed Oil	.62	.62	.62	.62	.62	.62	...
Open-Hearth Steel, ton	30.00	30.00	31.00	31.00	31.00	31.00	+1.00
Petroleum, bbl., Kansas, crude	1.00	1.00	1.00	1.00	1.00	1.10	+.10
Petroleum, bbl., Pennsylvania, crude	2.10	2.10	2.10	2.10	2.10	2.10	...
Rapeseed Oil, refined	.88	.88	.88	.88	.88	.88	...
Rubber, Fine Up-River, Para	.69	.70	.69½	.69	.70	.71	+.02
Silk, raw, Italian	...	...	5.25	...	...	5.25	...
Silk, raw, Japan	...	...	4.70	...	...	4.62½	—.07½
Sulphuric Acid, 60 Baume	1.00	1.00	1.00	1.00	1.00	1.00	...
Tin, 100 lb.	37.25	37.35	37.35	38.00	38.00	37.50	+.25
Tire Scrap	.05¾	.05¾	.05¾	.05¾	.05½	.05½	+.00½

Motor Stocks Soar

General Motors Common and Preferred Rise 48 and 13 Points Respectively

NEW YORK CITY, Dec. 14—Notwithstanding the sluggishness and backwardness of the rest of the market during the past week, automobile and accessory stocks as a group have continued on their upward movement. There is a certain element in Wall Street that believes the best speculative mediums of the future will be the automobile and accessory stocks. They base this theory on the large growth of the automobile industry and prospects of still greater expansion.

High Marks Made

The speculative boom at present in automobile stocks under the leadership of General Motors, saw new high marks made last week. General Motors common and preferred both rose substantially, the former 48 points and the latter 13 points. The announcement that there will be a directors' meeting next month at which action will be taken in regard to a common stock dividend seemed to have a strong effect on all the stocks. A comparison of the prices of the four leading automobile stocks, General Motors, Chevrolet, Studebaker and Willys-Overland, on Saturday with those on Monday, will show the sensational rises that have been taking place in these stocks lately: General Motors, 474 on Saturday and 558 on Monday, gain 84; Chevrolet, 125 on Saturday and 155 on Monday, gain 30; Studebaker, 150⅞ on Saturday and 173½ on Monday, gain 22⅝; and Willys-Overland, 235 on Saturday and 255 on Monday, gain 20. Incidentally, Chevrolet stock will shortly be added to the list of motor shares on the exchange. The stock was offered to the public at 85 by a banking syndicate some time ago.

A number of important gains were made in other stocks, Ajax-Grieb common rose 25 points and reached the 400 mark. Its preferred closed at 105 with a 4 point gain. Goodyear common rose 4 points and its preferred 3 points. The first and second preferred of Kelly-Springfield rose 1 and ¼ points, respectively. Packard common rose 5 points. Stewart-Warner common rose 1 point.

G. M. C. Common High

General Motors common featured the Detroit Exchange with a 57½ point rise, the stock reaching 520. Its preferred rose 11½ points, reaching 120. Packard common rose 9 points. Studebaker reached the 164 mark with a 14-point gain. In the inactive stocks there was

a 400-point gain in Canadian Ford stock, which closed at 2400.

During November 49,375 shares of stock were sold on the Detroit Stock Exchange and of this number 12,465 were Reo Motor Truck Co.'s shares and 10,566 were Reo Motor Car Co.'s shares. The price of the shares of the truck company varied from 20¾ to 25¼ and the shares of the Reo car company varied in price from 40½ to 55. The par value of these shares is 10.

The next largest sales of motor stocks was that of 1746 Maxwell common, at from 68¼ to 80½, 1295 shares of General Motors common were sold, at from 370 to 478. Other sales for the month were: 500 shares of Packard common and Studebaker preferred, 40 Packard preferred and 215 Studebaker common; 128 shares of Paige-Detroit, 35 shares of General Motors preferred; 240 shares of Chalmers common and 60 preferred; 471 shares of Continental Motor Mfg. common and 20 preferred.

—

Weier-Smith Truck Raises Capital

BIRMINGHAM, MICH., Dec. 6—The capital stock of the Weier-Smith Truck Co., has been increased from $30,000 to $50,000. This company, which started in business in 1914, will soon bring out a new model of its four-wheel-drive trucks, of 1½-ton capacity.

—

Michigan Fender Capital $60,000

YPSILANTI, MICH., Dec. 9—The capital stock of the Michigan Crown Fender Co. has been increased from $20,000 to $60,000.

New Premier Co. Is Organized

—

Premier Motor Car Co., with $2,500,000 Capital, to Continue Car

INDIANAPOLIS, IND., Dec. 10—Following the purchase of the Premier Motor Mfg. Co.'s plant by a syndicate as announced in THE AUTOMOBILE for Dec. 2, a new corporation is being formed which will be known as the Premier Motor Car Co. It will have a capitalization of $2,500,000 and will continue the manufacture of Premier cars. A deal has been completed by which the new company becomes the owner of the T. B. Laycock Co. plant, and all the machinery and other material at the old Premier plant will be moved to the Laycock factory. A manufacturing concern which has been occupying a part of the plant will move out to make way for the new Premier company.

The new Premier Motor Car Co. is composed of a syndicate of manufacturers and bankers from Joliet, Ill., Indianapolis and Detroit. The prime movers in the enterprise are: J. C. Flowers, of the Gerlach-Barklow Co., Joliet; E. W. Steinhart, Indianapolis; C. F. Jensen, president of the Vanguard Mfg. Co., Detroit; F. W. Woodruff, vice-president of the First National Bank and the Woodruff Trust Co., Joliet; George Woodruff, president of the First National Bank of Joliet and president of the Illinois Bankers' Assn.; T. R. Gerlach, vice-president of the Gerlach-Barklow Co., Joliet and H. L. Thompson, secretary of the Gerlach-Barklow Co., Joliet.

It is understood that other interests in Joliet, New York, Chicago and elsewhere are also interested in the enterprise. Mr. Flowers is slated for president and general manager of the new company and he, with the others named, will constitute the board of directors.

The Laycock plant consists of a main building 900 by 300 ft. with a 137 by 70-ft. three-story administration building and a modern power plant, all being located on a 43-acre tract inside the city limits overlooking Brookside park and the Indianapolis parkway. The buildings are of brick, steel and concrete and an automatic fire-sprinkling system is a feature. It is stated that 3500 men will be employed in the plant and that several large new buildings will be erected. The appraised value of the Laycock real estate, plant and equipment is approximately $1,000,000 and it is said that there will be no mortgages or debts of any kind against the company.

—

Dividends Declared

Reo Motor Car Co., quarterly, 2½ per cent on common, payable Jan. 10.

Gray & Davis, quarterly, 1¾ per cent on preferred, payable Jan. 1, to stock of Dec. 22, 1915.

J. I. Case T. M. Co., quarterly, 1¾ per cent on preferred, payable Jan. 1 to stock of Dec. 13, 1915.

Maxwell Motor Co.; 14¼ per cent on first preferred stock, payable in non-interest bearing warrants which have privilege of conversion into preferred stock at par. Warrants distributed Dec. 31 to stock of Dec. 29.

Automobile Securities Quotations on the New York and Detroit Exchanges

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
Ajax-Grieb Rubber Co. com	250	..	400	425	+25
Ajax-Grieb Rubber Co. pfd	100	..	105	..	+4
Aluminum Castings pfd	95	100	..	..	..
J. I. Case pfd	..	..	88	91	..
Chalmers Motor Co. com	..	92½	150	160	..
Chalmers Motor Co. pfd	87½	92½	101	103½	—1
Chevrolet Motor Co	..	..	146	148	+16
Electric Storage Battery Co	..	..	68	69½	+1
Firestone Tire & Rubber Co. com	340	..	690	705	..
Firestone Tire & Rubber Co. pfd	109	111	112	..	..
General Motors Co. com	84½	86	538	542	+48
General Motors Co. pfd	89½	91½	129	131	+13
B. F. Goodrich Co. com	25	26	72	73½	..
B. F. Goodrich Co. pfd	94	96	113	115	+2
Goodyear Tire & Rubber Co. com	185	191	334	339	+4
Goodyear Tire & Rubber Co. pfd	101	102	113	114	+3
Gray & Davis, Inc., pfd	..	..	..	..	..
International Motor Co. com	..	..	30	34	—4
International Motor Co. pfd	..	..	55	60	—5
Kelly-Springfield Tire Co. com	68	69	*295 † 74	300 75½	.. — ½
Kelly-Springfield Tire Co. 1st pfd	77½	78½	98	99	+1
Kelly-Springfield Tire Co. 2d pfd	95	97	†75	76	+ ¼
Maxwell Motor Co. com	14	14½	74	75½	— ½
Maxwell Motor Co. 1st pfd	43	45	99	99½	..
Maxwell Motor Co. 2d pfd	16	18	55	57	..
Miller Rubber Co. com	..	..	235	243	—5
Miller Rubber Co. pfd	..	..	110	111	—1
New Departure Mfg. Co. com	..	..	..	..	..
New Departure Mfg. Co. pfd	..	..	..	..	..
Packard Motor Car Co. com	..	100	150	160	+5
Packard Motor Car Co. pfd	90	..	99	102	—2
Paige-Detroit Motor Car	..	..	700	..	..
Peerless Motor & Truck Corp	..	..	36¼	36½	+1¼
Portage Rubber Co. com	25	30	60	65	..
Portage Rubber Co. pfd	80	85	99½	100½	+ ½
Regal Motor Co. pfd	..	..	18	23	..
‡Reo Motor Truck Co	10½	11¼	..	25	..
‡Reo Motor Car Co	21½	22¾	54	56	..
Splitdorf Electric Co. pfd	..	..	..	..	..
Stewart-Warner Speed Corp. com	46½	48½	87	89	+1
Stewart-Warner Speed. Corp. pfd	97	100	108	..	..
Studebaker Corp. com	32¾	34	165	167	+13
Studebaker Corp. pfd	87	88	114	114½	+3½
Swinehart Tire & Rubber Co	67	71	85	86	—3
Texas Company	..	..	213	215	+3
U. S. Rubber Co. com	49	51	53	55	—1
U. S. Rubber Co. 1st pfd	100	102	108	108½	+1
Vacuum Oil Co	..	..	226	231	..
White Company pfd	107	110	110	..	..
Willys-Overland Co. com	77	80	238	242	+8
Willys-Overland Co. pfd	86	90	114	114½	+1½

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
Chalmers Motor Co. com	..	94	..	160	—1
Chalmers Motor Co. pfd	87½	92½	102	104	+1
Continental Motor Co. com	155	180	247	257	+2
Continental Motor Co. pfd	..	75	92	..	+1
General Motors Co. com	76	77	520	530	+57½
General Motors Co. pfd	86	88	120	129	+11½
Maxwell Motor Co. com	13½	14½	74	76	+1¼
Maxwell Motor Co. 1st pfd	42	44	98	100½	+ ½
Maxwell Motor Co. 2d pfd	16	18	54	57	+1½
Packard Motor Car Co. com	..	100	152	161	+9
Packard Motor Car Co. pfd	90	..	100½	..	+2
Paige-Detroit Motor Car Co	..	..	700	735	..
‡Reo Motor Car Co	21⅝	22¼	54¾	55½	..
‡Reo Motor Truck Co	10½	11⅛	21½	22¼	—1½
Studebaker Corp. com	..	..	164	167	+14
Studebaker Corp. pfd	..	..	113	117	+1½

INACTIVE STOCKS

‡Atlas Drop Forge Co	..	25	28	30	+1
Ford Motor Co. of Canada	..	500	2400	2750	+400
Kelsey Wheel Co	185	..	220	..	..
‡W. K. Prudden Co	..	20	24½	..	+ ⅜
Regal Motor Car Co. pfd	..	25	..	22½	—1½

*Old. †New. ‡Par value $10.

Militia To Have Cars

War Dept. in Conference with Automobile Reserve Corps Accepts Its Plans

WASHINGTON, D. C., Dec. 11—The Automobile Reserve Corps movement, promoted by *Motor Print* magazine, received recognition by the War Department to-day. The plan of organization of an Automobile Reserve Corps Company was described by Lieut. Col. Chauncey B. Baker, the army transportation expert, in a conference to which had been invited G. T. Bindbeutel, editor of *Motor Print*, and H. D. Brandyce, editor of the Automobile Blue Book. The conference was at the direction of Brig. Gen. A. L. Mills, Chief, Division of Militia Affairs.

It is said that a number of cities can now proceed with the organization of an Automobile Reserve Corps which will be acceptable to the government. The formation of a volunteer motor car company has been given thorough study by Colonel Baker, whose report, not ready for publication until approved by the general staff, covers many pages of typewritten matter.

Twenty-seven Cars per Company

The plan calls for twenty-seven cars to each company and twenty-eight drivers, one an emergency driver. These drivers are described as chauffeurs to distinguish them from wagon train drivers. A chauffeur will have the rank of sergeant. Each motor company will be under the command of a first class sergeant with the title of car master. There will be three assistant car masters, sergeants; one machinist, sergeant; one helper, private; one cook; one watchman, private; one trumpeter, private. Each company is also to have one wrecking car and five motorcycles.

In the report of the study of an Automobile Reserve Corps Company by Colonel Baker is a full statement of the duties of the chauffeur. This is so minute in its details as to specify the time when grease cups are to be turned, when brakes and tires are to be tested, when the storage battery is to be given attention—in fact, a program has been drawn up which would convert an ordinary motorist into a very cautious, well trained driver in a short time. One of the principal provisions, which is emphasized by strong language and many paragraphs of repetition, is against over-loading.

There would be one or more automobile companies to a regular army division consisting, for instance, of nine regiments of infantry, one regiment of cavalry, two regiments of field artillery, one battalion of engineers, one battalion of the signal corps and the hospital and ambulance equipment.

Accompanying an army in campaign will also be a complete field repair shop. These shops will be in charge of officers who have spent some time in the leading American automobile factories. It is understood that a great many officers are now being so trained. Just how many, Colonel Baker would not say, although he admitted that the plan would be given a fairly extensive trial.

During the conference a sergeant reported to Colonel Baker, advising that he had finished his three months' course with the White Co. in Cleveland. Colonel Baker asked him for recommendations. The sergeant said:

"The experience was very valuable. I think, however, that we should spend six months instead of three months in these factories. I was kept on a job in the White plant until I had mastered the process. Then I moved to another department. While I am completely instructed as to the construction of a car, I am sure that there would have been more benefits if I had had just twice as much time."

In the event that the Automobile Reserve Corps is not fully organized all over this nation, the government has a substitute plan for the chartering of cars and trucks from automobile factories and large concerns having many cars and trucks in service. This plan embraces the enlistment of experienced drivers. A form of contract has been drawn up, by the terms of which the lessee of the automobile or truck would receive so many dollars a day for the hire of the car and so much extra depending on mileage. These figures are in Colonel Baker's report but cannot be given out for the present. In the contract the value of the car is stipulated and the government agrees to keep the truck in first class condition and, in the event of an accident, to reimburse the lessee for the full value as agreed.

Truck Company Organization.

The organization of a truck company, already in the military regulations, is similar to the car company. There is the same number of vehicles and chauffeurs and car masters; and the same ranking, excepting that two machinists are named who are corporals. In addition, the regulations require no trumpeter but specify two oilers which, according to Colonel Baker, have been found to be unnecessary and probably will be discontinued at the next change of the regulation.

The motor companies in the Automobile Reserve Corps are principally intended for the transportation of troops. It will be left to the automobile truck companies to transport ammunition, food and supplies of clothing and incidentals.

"That is, the trucks will deliver to the wagon train, which will in every case deliver to the army on the firing line," said Colonel Baker. "Ordinarily an automobile truck should not approach closer than a one and one-half day journey what we call the line of kitchens. Occasionally when the army is on the march the trucks may come as near as a half day distant. But armies, you know, spread out over corn fields and swamps and hills and off roads, where a heavily laden truck cannot proceed with the same success as a horse-drawn wagon."

Colonel Baker said that the use of automobiles of all descriptions for the transportation of troops was proved with vehemence when the Germans were marching on Paris in 1914. He said that it was only by the use of motor cars that General Gallieni was able to dispatch troops from Paris so swiftly to certain points as to thwart the advance of the invaders. Colonel Baker said that the great value of the Automobile Reserve Corps would be in concentrating and mobilizing troops—in the event of war, moving great masses of troops to new positions over night.

Militia Lacks Transports

Brigadier General Mills, in a statement to Mr. Bindbeutel just before the conference to-day, said:

"It is encouraging to know that you have been able to get promising responses in your work, and I can assure you all possible encouragement will be extended to you by this office. Inasmuch as the transportation facilities of the organized militia are now in great part lacking, so far as divisional trains are concerned, the War Department will be very glad to see the States organize and maintain their proper components. Of course, the organization of such units is entirely a matter to be taken up by the States concerned; such organizations being part of the organized militia would participate in federal assistance just as is the case with infantry or other units."

Preparedness Meeting for Met. S. A. E.

NEW YORK CITY, Dec. 9.—The Metropolitan section of the Society of Automobile Engineers will hold its December meeting on Dec. 16 at the Automobile Club of America, where a paper will be read by Capt. Gordon Johnson, Eleventh Cavalry, U. S. A., on What the S. A. E. Can Do for the U. S. Army.

New Troy Trailer Out

TROY, OHIO, Dec. 10—A new four-wheeled trailer of 1250 lb. capacity to sell at $125, has just been brought out by the Troy Wagon Works Co., this city. This is the lighest Troy trailer made. It has a 70-in. wheelbase, standard 56-in. tread and is mounted on solid tires.

54 New Show Exhibitors

80 Car Exhibitors for N. Y. and 86 for Chicago—307 Accessory Firms

NEW YORK, Dec. 13—Six additional car exhibitors for the National Shows at New York and Chicago and forty-eight new exhibitors of accessories were allotted space during the past week, making the list of complete car makers for the New York Show eighty and for the Chicago exhibition eighty-six, while the accessory exhibitors total 307, nearly all of whom will be present at both shows. There will be seven makers of electric cars at each show.

The new car exhibitors are S. J. R. Motor Co., Boston, Mass., maker of the S. J. R. car; the Lescina Auto Co., Newark, N. J., the Lescina car; both exhibiting at the Palace. At Chicago, the Princess Motor Car Co., Detroit, Mich.; Walker Motor Vehicle Co., Chicago, and the Gadabout Co., New York City, are to be added, while the Champion Auto Co., Chicago, will exhibit the Champion car at both shows.

Society day at the New York Show is to be Wednesday, Jan. 5, but contrary to the custom of previous years, no double admission will be charged. The show will open at 2 p. m. Friday, Dec. 31, and at 10 a. m. daily thereafter. The Chicago show will open at 2 p. m. Jan. 22 and at 10 a. m. daily thereafter. The closing hour in each case is 10.30 p. m.

Exhibits for the fourth floor at the Palace may be received as early as 8 a. m. Tuesday, Dec. 28. The receiving room will be closed at noon on the opening day and at 10 a. m. on Monday, no cars, boxes or crates being permitted to enter after noon of the opening day. Shipments will be received at New York on Thursday morning and at Chicago on Friday morning preceding the opening day. At Chicago no cars will be admitted after Sunday following the opening day.

The new accessory exhibitors are as follows:

New York and Chicago

American Chauffeur Pub. Co. Cincinnati, Ohio
Champion Auto Equipment Co. . . Chicago, Ill.
Burd High Compression Co. . . . Rockford, Ill.
Clear Vision Cleaner Co. . . . . New York City
Efficiency Oil Corp. . . . . St. Louis, Mo.
J. Rogers Flannery & Co. . . . . Pittsburgh, Pa.
Friestedt Rim Contractor Co. . . . Chicago, Ill.
Militaire Autocycle Co. of America, Inc. . . . . Buffalo, N. Y.
Platt Washburn Refining Co. . New York City
Fulton Co. . . . . Knoxville, Tenn.
Hill-Smith Metal Goods Co. . . . . Boston, Mass.
Prest-O-Lite Co. . . . . Indianapolis, Ind.
Master Carbureter Corp. . . . . Detroit, Mich.
Wayne Oil Tank & Pump Co. New York City.

New York Only

Adams Express Co. . . . . New York City
Adamson Mfg. Co. . . . . E. Palestine, Ohio
Corbin Screw Corp. . . . . New Britain, Conn.
Auto Journal Pub. Co. . . . . Pawtucket, R. I.
Boston Blacking Co. . . . . E. Cambridge, Mass.
Brilliant Products Co. . . . . New York City
Continental Auto Heater Co. . New York City
Dubois Machine Shop, Inc. . . . . Albany, N. Y.
Eisenstadt Mfg. Co. . . . . St. Louis, Mo.
Foster Accessories Co. . . . . Chicago, Ill.
General Electric Co. . . . . Schenectady, N. Y.
Matt Irion & Sons. . . . . Louisville, Ky.
Jay & Dee Specialty Co., Inc. . New York City
Juhasz Carbureter Co. . . . . New York City
Ward-Leonard Electric Co. . Bronxville, N. Y.
Lowe Motor Supplies Co. . . . . New York City
F. W. Mann Co. . . . . Milford, Conn.
Paul G. Niehoff & Co. . . . . Chicago, Ill.
Price Elec. Devices Corp. . . . Waynesboro, Va.
Rubberset Co. . . . . Newark, N. J.
Seiss Mfg. Co. . . . . Toledo, Ohio
Small & Singleton. . . . . Brooklyn, N. Y.
Standard Accessories Co. . . . . New York City
G. T. Sutterley & Co. . . . . Philadelphia, Pa.
Traveller Tire & Tube Co., Inc. New York City
Wells-Fargo & Co., Exp. . . . . New York City
Westinghouse Air Spring Co. . New York City

Chicago Only

F. A. Ames Co. . . . . Owensboro, Ky.
Becker Bros. . . . . Chicago, Ill.
Edison Storage Battery Co. . . . Orange, N. J.
H. H. Franklin Mfg. Co. . . . . Syracuse, N. Y.
Hess Spring & Axle Co. . . . . Cincinnati, Ohio
National Carbureter Co. . . . . Chicago, Ill.
N. Y. & N. J. Lubricant Co. . . New York City

—

Three Detroit Show Buildings

DETROIT, MICH., Dec. 13—The fifteenth annual Detroit automobile show which will be held Jan. 15 to 22, will be quartered in three large buildings, forming part of the Riverside summer gardens, and located at East Jefferson Avenue and the Belle Isle bridge. They will provide about 60,000 sq. ft. of floorspace and will be decorated appropriately.

—

Fifty Exhibitors for Cleveland

CLEVELAND, OHIO, Dec. 10—All the display space at the Cleveland automobile show, to be held at the Wigmore coliseum Jan. 8 to 15, has been taken. In all there will be fifty exhibitors.

—

25 Wintons Cover 303,919.3 Miles Without Repairs

CLEVELAND, OHIO, Dec. 14—The chauffeurs of twenty-five Winton cars drove 303,919.3 miles without any expense for repairs in the eighth annual chauffeurs' contest of the Winton company. The average repair expense for the nearly 2,000,000 miles in these eight contests is 19¼ cents per 1000 miles. Thirty-five hundred dollars was awarded. Mileages were restricted to a maximum of 12,500. Twenty drivers covered this distance. A special prize to owners for a best record by a model 21-A was won by H. J. Browning of Tarrytown, N. Y., who will receive a new Winton for the one he is driving. The leaders among the winners are tabulated herewith.

—

Kelly-Springfield Tire May Move to Springfield

AKRON, OHIO, Dec. 9.—The Kelly-Springfield Tire Co. may move its Akron plant to a new one in Springfield, Ohio, according to plans of the company. Though up to the present time no suitable location has been obtained in that city the officials of the concern have been negotiating for the purchase of land there, upon which to erect new factory buildings.

—

Rumely Properties Sold

SOUTH BEND, IND., Dec. 11—The properties of the M. Rumely Co. and the Rumely Products Co., totaling $32,000,000, were sold at receiver's sale Dec. 9, at the main offices of the M. Rumely Co., in Laporte, Ind., by F. P. Mount, receiver and special master, acting under instructions from Judge A. B. Anderson of the Federal Court at Indianapolis. The purchasers were the Advance-Rumely Co. and the Advance Thresher Co.

—

S. G. V. Creditors Meeting Dec. 21

PHILADELPHIA, PA., Dec. 11—Stephen M. Meredith of Reading, Pa., has been appointed by the Berks County Court as master in the equity proceedings of the S. G. V. Co., against itself, in the distribution of the balance in the hands of R. E. Graham, receiver. Creditors are advised to meet the master in the Court House on Dec. 21.

Twenty-five of the Winners in Winton Chauffeur Contest

Prize	Winner	Car Owner	City	Total Mileage
$500	Vivian Prichett	S. J. Franklin	Millville, N. J	12,500
400	F. S. Weaver	S. R. Bush	Easton, Pa.	12,500
300	A. C. Burton	Mrs. T. B. Dozier	San Francisco	12,500
200	W. M. Newsome	M. R. Hirsch	Atlanta, Ga.	12,500
100	Hugo Larson	R. W. Stevens	Highland Park, Ill.	12,500
100	A. E. Withers	J. A. Robertson	Montreal	12,500
100	Herbert Lewis	Geo. Spottiswoode	Orange, N. J.	12,500
100	J. L. Dondero	F. M. Hauthaway	Brookline, Mass.	12,500
100	Robt. Clements	F. H. Jones	Andover, Mass.	12,500
100	Jas. F. Kerrigan	F. W. Carter	Newton Center, Mass.	12,500
100	Wm. F. Swart	Edwin A. Oliver	Yonkers, N. Y.	12,500
100	Thos. Murren	Jas. M. Anderson	Boston, Mass.	12,500
100	Geo. T. Macone	F. E. Coursen	Stockbridge, Mass.	12,500
100	Grant E. Gregor	C. J. Rainear	Philadelphia	12,500
100	E. Ziegeler	M. W. Sanger	New York City	12,500
100	Geo. M. Lewis	E. R. Caldwell	Syracuse, N. Y.	12,500
100	Robt. Goetsch	H. K. Browning	Tarrytown, N. Y.	12,500
100	P. O. Hale	A. P. Friend	Waltham, Mass.	12,500
100	E. M. Armstrong	C. M. Goodnow	Boston	12,500
100	Clarence Hudson	S. Harry Worth	Philadelphia	12,500
*100	W. J. Desillire	Allen Arnold	Boston	11,267
*100	Paul Hesselnberg	Gustav Lange	Bronx, N. Y.	12,464.7
*100	Wm. C. Ball	F. F. Rowe	Kalamazoo, Mich.	11,380
*100	Geo. H. Von Arx	Jos. J. Gross	St. Louis	12,416.4
*100	B. Thyssen	S. Aronson	Los Angeles	6,391.2
	Totals			303,919.3

*Winners of district prizes.
Total repair expense of all cars in the table, None.

Chicago Feature Race 300 Miles

Speedway Directors Follow Hoosier Track's Example—Prizes Reduced to $30,000

CHICAGO, ILL., Dec. 15—There will be no 500-mile race on the Chicago speedway during the season of 1916, the directors of the local track following the example of the Indianapolis promoters and reducing the distance of their feature event to 300 miles.

They also have adopted a policy of financial conservatism and conservation of gate receipts and have cut the prize money from $54,000 to $30,000. It is probable that the winner will receive $12,000 or 40 per cent of the total.

Chicago's 300-mile race will be held June 19 and the entry blanks will be sent out immediately. The entry fee will be $100 but this will be refunded provided the car reports for the elimination trials.

Amateur Race May 20

May 20 is the date decided on for the amateur drivers' race and entry blanks will be mailed as soon as the contest board of the American Automobile Association confirms the special set of rules.

A. C. A. Tests Car Heater

NEW YORK CITY, Dec. 15—The Four-in-One automobile heater made by the Continental Auto Heater Co., New York City, was tested yesterday by the technical committee of the Automobile Club of America. The heater draws gas from the exhaust pipe of the motor and the test was for the purpose of determining whether or not there was any loss of power due to the installing of the device. According to the officials of the A. C. A. there was less back pressure with the device attached than without it, showing conclusively that the application of the Four-in-One heater would cause no loss of power.

$10,000 Addition for Crow

SOUTH BEND, IND., Dec. 11.—Owing to the fast increasing demand for Crow cars, the Crow Motor Car Co., Elkhart, Ind., has found it necessary to increase the capacity of the plant and the construction of a large addition has been commenced. It is expected the addition will be completed by the first of the year and the output of the plant will have been increased to 350 finished cars a month. The new extension will be 45 by 240 ft. and cost approximately $10,000. The main part of the new building will be utilized as the body department. The arrangement will allow for the rough lumber to be unloaded from the cars at one end and be worked through to the finished body at the other. At present the plant is turning out a complete automobile almost every working hour. The December production will be 150 cars, and orders have been received which will keep the concern busy during practically the entire automobile season of 1916. The gross business of the Crow company the past year was approximately $2,000,000. With the completion of the addition it is expected to double the production of the present plant.

Non-Stop Maxwell Covers 7647.6 Miles to Dec. 7

LOS ANGELES, CAL., Dec. 7—With a total of 7647.6 miles covered since noon, Nov. 22, the Maxwell 25 which is making an attempt to establish a new world's non-motor-stop record is now on the second half of the record run.

A puncture made one tire change necessary but there has been no other stop except for oil, gas and water at the regular control where the supplies taken on have been recorded by the observer on duty and in most cases by the one to go on the next eight-hour shift.

The present non-motor-stop record is 12,404.9 miles, made in San Francisco more than 2 years ago.

American Brass Gives $35,000 Christmas Present

KENOSHA, WIS., Dec. 10—As an appreciation of the co-operation given by its 1900 employees in making 1915 the most prosperous year the concern has ever experienced, the American Brass Co., Kenosha, Wis., on Dec. 7, made a Christmas present to each employee, the whole amounting to $35,000.

Champion Plug Convention Dec. 27-30

TOLEDO, OHIO, Dec. 14—The annual convention of salesmen affiliated with the Champion Spark Plug Co., will be held in Toledo, Dec. 27, 28, 29 and 30.

The main purpose of the meeting is to bring the selling staff together so that they can go over the advertising and selling plans for the coming year. Last year the Champion company made and sold 6,000,000 spark plugs while the plans for the coming year call for a production of 12,000,000.

Overland Service Station in Boston

BOSTON, MASS., Dec. 15—The Willys-Overland Co. will erect a three-story service station in this city at Brookline Avenue and Butler Street, for Overland and Willys-Knight owners. The building, which will be 105 by 260 ft. will give 81,900 sq. ft. of floorspace.

Iowa Maxwell Dealers Meet

DES MOINES, IOWA, Dec. 10—Iowa dealers for the Maxwell Motor Co. assembled in Des Moines on Dec. 8, to discuss trade conditions and make plans for the 1916 selling campaign. The partial payment plan for selling Maxwell cars was outlined by F. L. Buckbee, factory representative from Detroit and addresses were made also by E. M. Lubeck of Chicago, district sales manager; C. R. Newby of Detroit, factory sales representative; and W. L. Giffens of the Maxwell Auto Sales Co., Chicago.

U. S. Tire Convention Opens

DETROIT, MICH., Dec. 14—About 350 members of the sales organization of the United States Tire Co. are here from all over the country to take part in the annual convention starting to-day. They will be addressed by the officers of the company on many subjects dealing with the tire business and part of the time will be spent in going through the local plant.

Chalmers Warehouse in Des Moines

DETROIT, MICH., Dec. 10—The Chalmers Motor Co. will establish a large factory warehouse in Des Moines, Iowa, to enable its Iowa dealers to be supplied quicker and at less transportation charges, of the cars they need. J. H. W. Mackle, who was Chalmers district manager for the Central States, will be in charge of the warehouse and the work of distribution. His offices are temporarily at 411 Hubbell Building. The Iowa Auto & Supply Co. remains the Chalmers distributor in Des Moines.

DES MOINES, IOWA, Dec. 10—Chalmers Day for Iowa was celebrated in Des Moines on Dec. 9, with Chalmers dealers and distributors from every section of the State to the number of over 200 in attendance. Business sessions were held during the day with a luncheon party at noon and a dinner at night.

Michigan Firestone Dealers Meet

DETROIT, MICH., Dec. 11—Firestone tire dealers from Michigan met here this week at a business convention, at which officials of the Firestone Tire & Rubber Co., Akron, Ohio, were present. At the banquet given the dealers, Secretary S. G. Corkhuss announced that owing to the great increase in business in Michigan, a new and much larger branch house will be built here. At the convention the new Firestone tire with black tread and red side walls was shown the dealers for the first time.

Continental Contract for Splitdorf

NEWARK, N. J., Dec. 10—The Splitdorf Electrical Co., this city, has secured a contract from the Continental Motor Mfg. Co., Detroit, Mich., for Dixie-40 magnetos, cables and switches. All Continental motors used for show purposes or submitted to manufacturers as samples will be Dixie equipped and so filled on orders unless working specifications call for other ignition.

Factory Miscellany

Plant for Tubeless Tire—The Tubeless Tire and Rubber Co., recently organized, will establish a plant at Millersburg, Ohio.

Parts Plant for Columbus—Dore Ogden, manufacturer of automobile parts, will construct a plant at Columbus, Ind.

Mason Tire to Build—The Mason Tire and Rubber Co. is planning a factory at Akron, Ohio, the estimated cost of which is $60,000.

Faultless Rubber Adds—The Faultless Rubber Co., Ashland, Ohio, has awarded contracts for an addition to its plant, which will cost about $10,000.

Wheel Co. for Montana—The Montana Improved Wheel Co., Bozeman, Mont., will erect a plant for the manufacture of a spring wheel for automobiles.

Apple Top Co. to Build—The Apple Auto Top Co., Dayton, Ohio, has had plans prepared for a brick building, 100 by 150 ft., four stories, to take the place of its plant recently destroyed by fire.

Cleveland Automatic Machine Adds—The Cleveland Automatic Machine Co., Cleveland, Ohio, has bought from the Pontiac Improvement Co. and the Kurtzner Radiator Co. the radiator company's property at 2225 Ashland Road. The deal represents between $50,000 and $100,000.

Columbia Truck to Build—The contract for the plant of the Columbia Motor Truck & Trailer Co., Pontiac, Mich., has been let. It will be a one-story structure, 60 by 250 ft. The company, which moved here from Kalamazoo, is reported to have sufficient orders on its books to keep it running for the next six months.

Perfection Coil Spring Adds—Pending the erection next spring of a new plant, 140 by 140 ft., the Perfection Coil Spring Co., Jackson, Mich., is adding to its present factory a building 150 by 36 ft., to be used as a stock room and for plating purposes. Although this concern started in business less than two years ago it has been growing exceptionally fast and must make provisions to double its production.

Salisbury Co. Makes Improvements—The Salisbury Wheel and Mfg. Co., Jamestown, N. Y., has erected a new office building to provide room for its front axle department, moved there from Greenville, Pa. The new office building is three stories high and is 30 by 50 ft. in size. By March, 1916, it is expected that additional factory buildings, providing 30,000 sq. ft. more of floorspace, will be completed. With this increased space the production will be brought up to 150 full sets of automobile wheels and axles per 9-hr. day, an increase of 50 per cent over the present capacity of 100 sets per day. The number of employees of the company is 400.

Continental Adds Another Building—Work is progressing upon the various additions to the plant of the Continental Motor Mfg. Co., Muskegon, Mich. It has just been decided to put up another new building, one story high, 50 by 150 ft., adjacent to the new drop forge plant, to be used for storage of materials. The new drop forge plant is expected to be ready within the next two weeks, as far as the building is concerned, but the six steam drop forge hammers, weighing from 1500 to 5000 lbs. each, are not expected here from the East for about six weeks, for which 6-ft. concrete foundation bases are being put up. The new motor storage and carpenter building is ready, having been completed in fifty-one days. A 150-ft. subway, 7 to 15 ft. in height and 11 ft. wide, of concrete, will be ready in ten days. It connects the new lake front building with the office and machine building.

The Automobile Calendar

Dec. 11-18	New Castle, Pa., Show, Skating Rink on Nechannock Avenue.
Dec. 31-Jan. 8	New York City, Sixteenth Annual National Automobile Show; Grand Central Palace; National Automobile Chamber of Commerce.
1916	
Jan. 1	Springfield, Mo., Show, Springfield Motor Car Dealers' Assn.
Jan. 3-9	Importers' Salon, Hotel Astor.
Jan. 5-6	New York City, S. A. E. Winter Session, Standards Committee Meeting.
Jan. 7, 8, 10, 11	New York City, Convention National Assn. of Automobile Accessory Jobbers.
Jan. 7-13	Milwaukee, Wis., Show, Auditorium.
Jan. 8-15	Cleveland, Ohio, Show, Wigmore Coliseum, Cleveland Automobile Show Co.
Jan. 8-15	Philadelphia, Pa., Show, Philadelphia Auto Trade Assn.
Jan. 14-22	Dayton, O., Show, Delco Bldg., Dayton Automobile Dealers' Assn., and Dayton Accessory Dealers' Assn.
Jan. 10-15	Fort Wayne, Ind., Show, Auto Trade Assn.
Jan. 10-15	New Bedford, Mass., Show, State Armory.
Jan. 15-22	Detroit, Mich., Show, Detroit Automobile Dealers' Assn.
Jan. 17-22	Rochester, N. Y., Show, Exposition Park, C. A. Simmons, Mgr.
Jan. 17-22	Wilmington, Del., Show, Wilmington Automobile Show Assn.
Jan. 18-22	Baltimore, Md., Show, Fifth Regiment Armory.
Jan. 18-22	Lancaster, Pa., Show, Conestoga Park Pavilion.
Jan. 22-29	Montreal, Que., Show, Almy's Bldg., Automobile Trade Assn., Ltd.
Jan. 22-29	Chicago, Ill., Show, National Automobile Chamber of Commerce; Coliseum and First Regiment Armory.
Jan. 23-30	Portland, Ore., Show, Portland Automobile Dealers' Trade Assn.
Jan. 24-29	Buffalo, N. Y., Show, Buffalo Automobile Dealers' Assn., Broadway Auditorium.
Jan. 29-Feb. 5	Columbus, Ohio, Show, Memorial Hall, Columbus Automobile Show Co.
Jan. 29-Feb. 5	Minneapolis, Minn., Show, National Guard Armory, Minneapolis Trade Assn.
Feb. 1-3	Frederick, Md., Show, Armory.
Feb. 7-12	Kansas City, Mo., Show, Convention Hall, Kansas City Motor Dealers' Assn.
Feb. 9-12	Peoria, Ill., Show, Coliseum, Peoria Automobile and Accessory Assn.
Feb. 12-19	Hartford, Conn., Show, First Regiment Armory, Hartford Automobile Dealers' Assn.
Feb. 14-19	Des Moines, Ia., Show, Des Moines Auto. Dealers' Assn.
Feb. 19	Newark, N. J., Show.
Feb. 20-27	Grand Rapids, Mich., Show, Klingman Furniture Exhibition Bldg., Automobile Business Assn.
Feb. 21-26	Louisville, Ky., Show, First Regiment Armory.
Feb. 21-26	Omaha, Neb., Show, Omaha Automobile Show Assn.
Feb. 21-26	Portland, Me., Show, Exposition Bldg.
Feb. 21-26	Syracuse, N. Y., Show, Syracuse Automobile Dealers.
Feb. 28-Mar. 3	Pittsburgh, Pa., Convention of American Road Builders' Assn., Mechanical Hall.
Feb. 29-Mar. 4	Ft. Dodge, Ia., Show, Terminal Bldg., Ft. Dodge Automobile Dealers' Assn.
March 4-11	Boston, Mass., Car and Truck Show, Mechanics Bldg.
Mar. 9-11	Mason City, Ia., Show, Armory.
Mar. 21-25	Deadwood, S. D., Show, Auditorium, Deadwood Business Club.
Mar. 28-Apr. 3	Manchester, N. H., Show, Under Auspices Couture Bros. Academy.
May 13	New York City, Sheepshead Bay Speedway Race.
May 20	Chicago, Ill., Amateur Drivers' Race, Chicago Motor Speedway.
May 30	Indianapolis Track Race.
June 17	Chicago Track Race.
June 28	Des Moines, Ia., Track Race.
July 4	Minneapolis Track Race.
July 4	Sioux City Track Race.
July 15	Omaha, Neb., Track Race.
Aug. 5	Tacoma Track Race.
Aug. 18-19	Elgin Road Race.
Sept. 4	Des Moines Track Meet.
Sept. 15	Indianapolis Track Race.
Sept. 16	Providence Track Race.
Sept. 30	New York City Sheepshead Bay Race.
Oct. 7	Omaha Track Race.
Oct. 14	Chicago Track Race.

The Week in the Industry

Culver Makes Change—C. R. Culver, for many years a prominent figure with the Knox Automobile Co., is now vice-president and general manager of the Stoddard Motor Car Co., Springfield, Mass., handlers of the Pierce-Arrow line.

Cottingham Makes Ford Change—H. R. Cottingham, former sales manager of the Ford Motor Co. of Canada in Montreal, has been appointed manager of the Saskatoon branch of the same company, and has left to take up his new duties.

Causer Resigns—E. T. Causer, factory superintendent of the Mitchell-Lewis Motor Co., Racine, Wis., for the last three and one-half years, has resigned to accept the position of works manager of the R. D. Nuttall Co., Pittsburgh, Pa., gears, couplings, etc. Mr. Causer assumes his new duties at once.

—

Dealer

N. Y. Auburn Moves—F. W. Wright, Inc., general Eastern distributor for the Auburn car, has opened a new retail salesroom at 1874 Broadway, New York City.

Savage Tire in Vancouver—The Western Oil & Supply Co. has been appointed distributor for British Columbia for Savage tires, and a depot has been opened at 427 Hill Street, Vancouver, B. C.

Louisville Items—The Louisville Double Tread Tire Co. has opened an office and shop at 542 South Third Street. H. N. Cohen is president.

The Cherokee Motors Co., a new concern, has opened an office and salesroom at 305 West Walnut Street. A garage will be maintained at 712 Baxter Avenue. The company handles the Maxwell.

New Waco Wholesale Supply Co.—The Spencer-Carroll Co., Waco, Tex., will open a wholesale supply house, Feb. 1, succeeding the Stamford Motor Co., Stamford, Tex., which has operated a wholesale accessory business in connection with the Ford dealership. The latter will be dropped. J. O. Hughes, now manager of the Stamford Motor Co., will be active manager of the new company. Harry Knight, now connected with the Stamford Motor Co. as traveling salesman, will not travel for the new concern, but will have complete charge of the service end of the business. He was connected with the Electric Appliance Co., Dallas, as traveling salesman, and left it to affiliate with the Stamford Motor Co. about six months ago.

Motor Men in New Roles

Thompson Heads Mors Chain Branch—The Mors Chain Co.'s Detroit branch has opened a showroom and offices at 1003 Woodward Avenue. F. E. Thompson is the local manager.

Evans Maxwell Superintendent—J. F. Evans has been appointed superintendent of the service department maintained by the Maxwell Motor Co., at its plant on Oakland Avenue, Detroit.

Grasser Assistant Hupp Mgr.—Walter Grasser is now assistant manager of the Grasser Motor Co., Detroit and Toledo, distributor for the Hupmobile in Michigan and northwestern Ohio.

Wilson King Rep.—H. L. Wilson has been appointed factory district representative by the King Motor Car Co., his headquarters being Dallas, Tex. He was formerly connected with the King-Dort Sales Co., Detroit distributor for the King and Dort.

Two Chalmers District Mgrs.—C. L. Logan, until recently manager of the Cuyahoga Sales Co., Cleveland, Ohio, has been appointed a district manager by the Chalmers Motor Co. He will be in charge of the territory in West Virginia, Ohio and Kentucky.

H. L. Pelton has been appointed district manager of the Chalmers Motor Co. in the East, with the State of New York as his territory.

Kenyon Hupp Service Mgr.—J. L. Kenyon has been appointed service manager of the Hupp Motor Car Co., Detroit. He was formerly in the same capacity with the Cadillac Motor Car Co. M. E. Houser has succeeded J. L. Kenyon as service manager of the Cadillac company.

Falk Chalmers Rep.—J. H. Falk has become a special representative for the Chalmers Motor Co., with headquarters in Detroit.

DeWitt Makes Change—Frank DeWitt, manager of the Detroit office of the Electric Products Co., Cleveland, during the past two years, has been appointed director of sales of the American Distributing Co. of Detroit. R. C. Enos was elected vice-president and general manager of the American Distributing Co. at a recent meeting of the stockholders of the Detroit corporation.

Riley Resigns—N. S. Riley, for four years head of the Kansas City, Mo., branch of the Studebaker Corp. and president of the Kansas City Automobile Dealers' Assn., has resigned from both positions. His resignation will take effect Jan. 1. Mr. Riley will be succeeded as head of the dealers' association by W. A. Brace, president of the Hudson-Brace Motor Co., who formerly was vice-president. George A. Bond of the Bond Motor Co. becomes vice-president to succeed Mr. Brace.

Henshaw Makes Worcester Changes—The Henshaw Motor Co. of Boston, Mass., Eastern Massachusetts agent for the Dodge Brothers car, has leased the building at 256 Pleasant and 3 Newbury Streets, Worcester, Mass., to be used for stock and service purposes, the company retaining its present salesrooms at 27 Foster Street. This is the second time the company has been forced to expand in Worcester. New men have been added to the organization, among them F. W. Bailey, former secretary to the general manager at Gray & Davis factory; G. R. Green, former owner of the Commonwealth garage, who are on the sales force; J. J. Glennon, mechanical expert of the King Motor Car Co of New England, who becomes service chief, and E. W. Jacocks, an insurance official who is now chief accountant.

—

Dealer

Philadelphia Fisk Adds—The Fisk Tire & Rubber Co., 258 North Broad Street, Philadelphia, Pa., is having plans prepared for a three-story brick service building, 20 by 30 ft.

Philadelphia Packard Enlarges Territory—Manager L. J. Eastman, of the Packard Motor Car Co. of Philadelphia, announces the opening of additional tributary offices in the local territory at Wilmington, Del., Lancaster, Pa., and Williamsport, Pa. Announcement has also been made of the appointment of L. S. Jullien as territorial manager for the Pennsylvania district exclusive of Philadelphia.

Minneapolis Trade Items—The Willard Storage Battery Co., Minneapolis, Minn., has bought three lots at Harmon Place and Tenth Street and will erect a Northwestern headquarters.

Harvey E. Mack Co., representing Dodge Bros., and the B. F. Goodrich Co., is erecting a three-story building at Harmon Place and Thirteenth Street. It will remove from Hennepin Avenue. The Goodrich company will have 56 by 150 ft. and the Mack Co. 50 by 100 ft.